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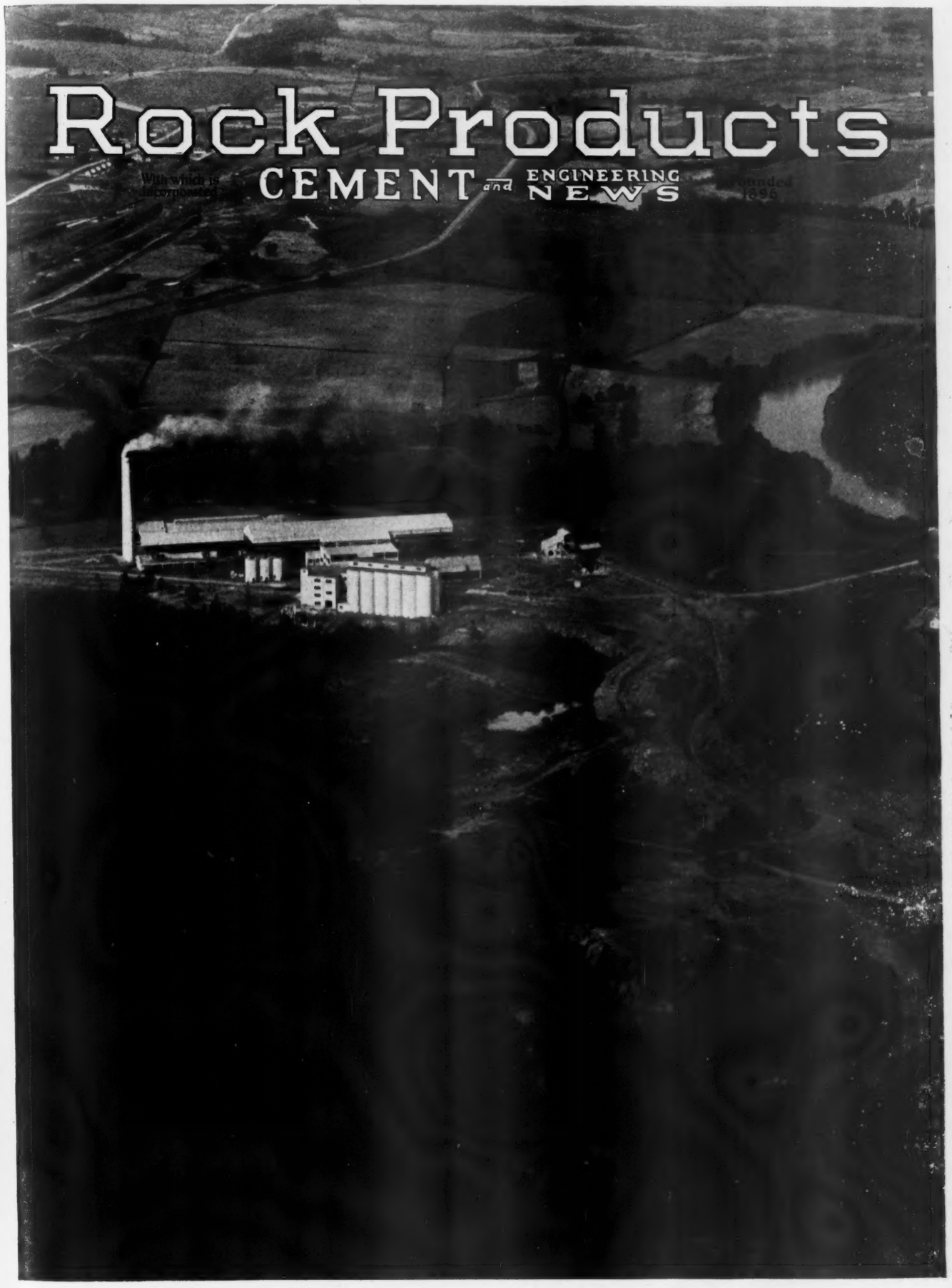
Rock Products

With which is incorporated CEMENT and ENGINEERING NEWS Founded 1896



Aeroplane view of the new Volunteer Portland Cement Co. plant near Knoxville, Tenn.

Volunteer Portland Cement Company's New Plant

A 3000-Bbl. Wet-Process Plant Using Marble and Shale for Raw Materials

By R. H. Rogers
Industrial Engineering Department, General Electric Co.

THE VOLUNTEER PORTLAND CEMENT CO.'S plant at Knoxville, Tenn., has been completed and is now in operation, thus making another knot in the network of Southern cement plants. In a grove of oaks and cedars fit for the finest country club, and using pink Tennessee marble, the stuff that banking houses are usually made of, stands the Volunteer; a plant well planned to take every advantage of a most unique physical and economic setting.

This plant, named after the "Volunteer State," is characterized by economic simplicity, minimum variety in equipment units and rigid departmental segregation as to power and equipment. With an undivided and active local market, raw materials above mill level, coal from within 40 miles, and electric power from the link between southern and northern networks, the management of the enterprise is in the hands of men of long and varied experience in the cement world, which serves to insure that all the favorable conditions surrounding the enterprise will be taken full advantage of.

The Volunteer plant is a 3000-bbl. wet-process mill, located six miles from Knoxville adjacent to the 10,000-car John Sevier yard of the Southern Railway. It is within the Knoxville terminal zone which is also served by the Louisville and Nashville Railroad. The nearest cement plant is over a hundred miles away and the local area is characterized by vigorous growth in keeping with its half million enthusiastic boosters for East Tennessee. The organization is an

This aeroplane view of the new plant of the Volunteer Portland Cement Co. at Knoxville, Tenn., shows the general layout remarkably well

General view of the plant, showing the kiln house at the left, cement storage and pack house in the center, and the crusher buildings at the right

independent $3,800,000 stock company in which there is invested much local capital. By judicious co-operation with the district business houses, the Volunteer company has already become an important factor in, and and asset to, Knoxville and the whole eastern end of the state.

Power Arrangements

Electric power is supplied to the plant at 66,000-v., 3-phase, 60-cycle by the Knoxville Power and Light Co. from the hydro-electric and steam-power stations of the Tennessee Power Co., which in turn is tied in with the Georgia, Alabama, Carolina and Appalachian systems. The Knoxville-Bridgeport line, which is tapped for this mill, recently acted as the connector between northern and southern networks, when all the important systems east of the Mississippi were synchronized as a unit.

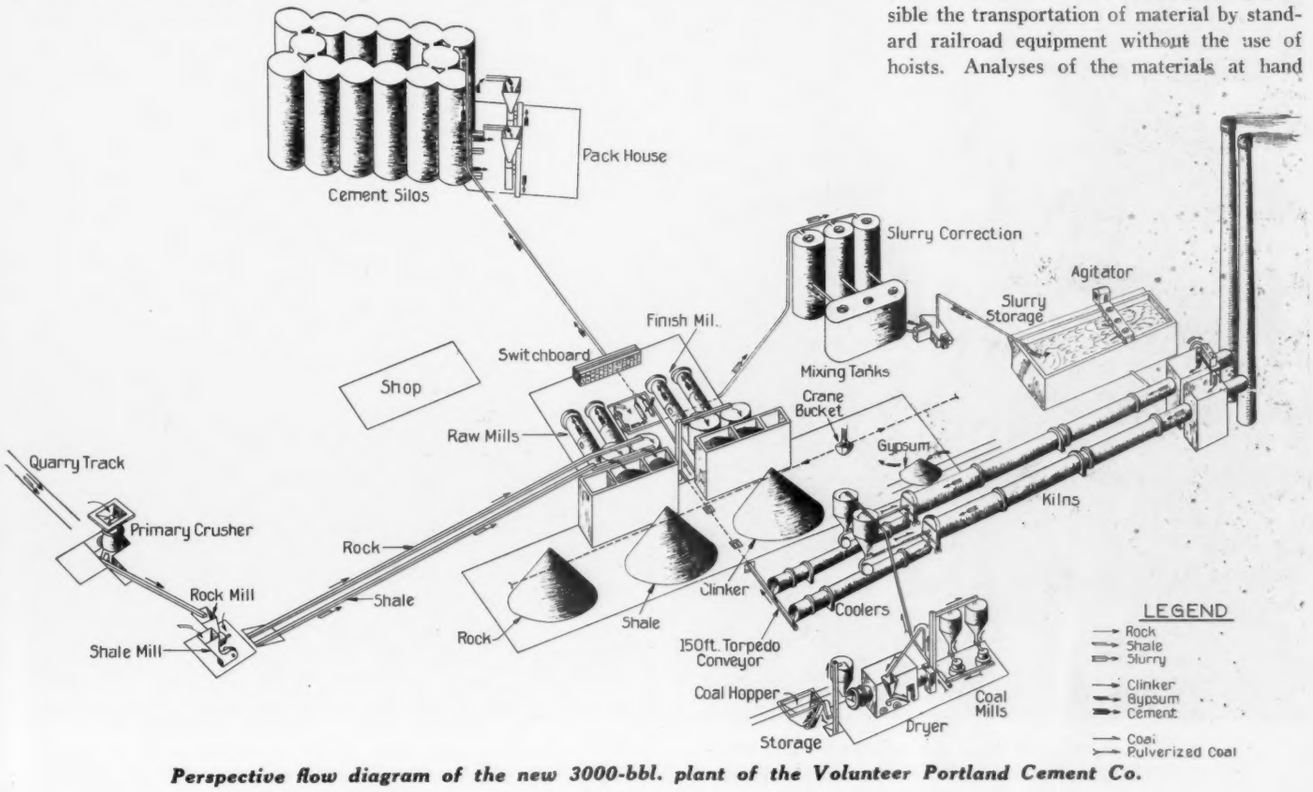
Power is delivered to the Knoxville Power and Light Co. substation by a 66-k.v. single-circuit, 3-phase line on wood poles. Power from the substation to the mill is carried by two three-conductor 500,000-cm., lead-covered, steel armored cables. The substation includes three 1250-k.v.a. transformers with 2300-v. secondary, oxide film lightning arresters, oil-circuit breakers, and the usual switch gear. The substation equipment and all the mill electrical equipment, including distribution, motors and control, were furnished by the General Electric Co.

Raw Materials

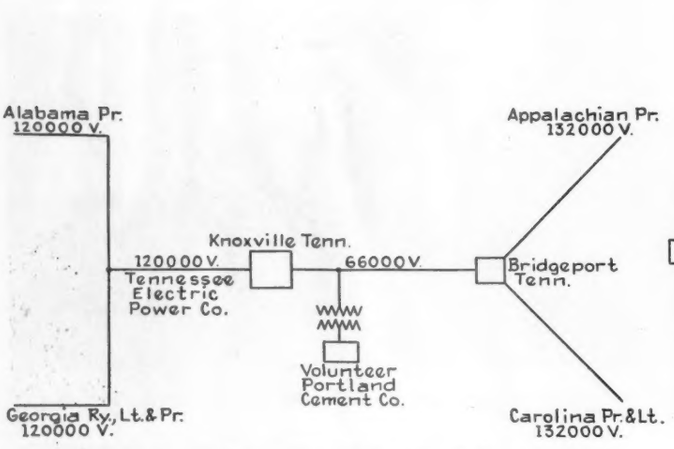
There are extensive coal mines within 40 miles of the plant, hence an abundance of short-haul coal is available at a very low cost at the mine, to which is added only about $1.15 per ton for delivery to the coal-mill hopper of the cement plant. Slack gas coal is used, which tests 34% volatile, 14% ash and 13,500 B. t. u. The mild winter weather prevailing here, the abundance of cars, and the short haul make a large storage system unnecessary.

Water for the mill supply is obtained above a dam in Wood's creek, near its confluence with the Holston river, and only a few hundred feet from the mill. Water for hydraulic stripping is obtained from the Holston river, which forms a mile of boundary to the property. The pump house for this operation is built on a floatable crib because of the flashy nature of the stream.

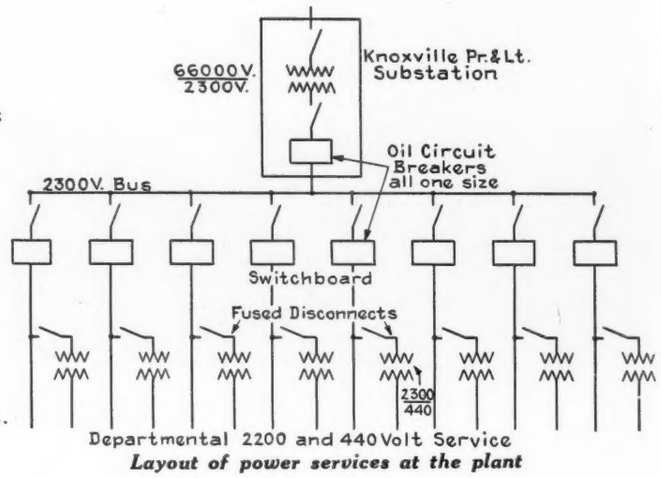
Marble, limestone, shale, clay and sandstone are exposed over a large part of the 400-acre property, and one or another underlies the remainder with a maximum of 30 ft. of overburden. The working face ranges from 20 ft. below to 60 ft. above the level of the crusher trestle, and as it is from 1500 to 2000 ft. away, there is only a 2% grade to the track which passes through a cut in a low intervening ridge, making possible the transportation of material by standard railroad equipment without the use of hoists. Analyses of the materials at hand



Perspective flow diagram of the new 3000-bbl. plant of the Volunteer Portland Cement Co.



Power lines supplying current for the Volunteer plant



Layout of power services at the plant

show the marble and the shale to be well balanced constituents, with limestone and sandstone available along the same track as correctives for each. Analyses of 20 samples of marble and 72 of shale show the following averages respectively, together with a typical analysis of the resulting cement:

	Marble Per cent	Shale Per cent	Cement Per cent
SiO_2	0.4	66.00	20.00
Al_2O_3	0.35	16.8	7.25
Fe_2O_3	0.19	8.14	3.40
CaO	55.05	0.3	65.00
MgO	Trace	1.9	0.6
Loss on ignition	42.865	5.0	....

Gypsum is obtained from Saltville, Va., about 130 miles away.

Quarry

The quarry floor level was established as low as safety from Holston river floods would allow, hence it is practically at mill-yard grade and 20 ft. below the crusher trestle. The face at the marble working is 20 ft. high, and will eventually be 80 ft. high, and as the strata are tipped up nearly vertical, the edges only are exposed so as to minimize rock falls. The quarry is in a syncline or trough of limestone, lined with marble and filled with shale. A few hundred feet nearer the crusher are the shale workings, the output going over the single track from quarry to mill. Exploration and blast holes are now drilled by a gas-engine-powered, well-drill, but electric-powered drills will be installed when the face height warrants.

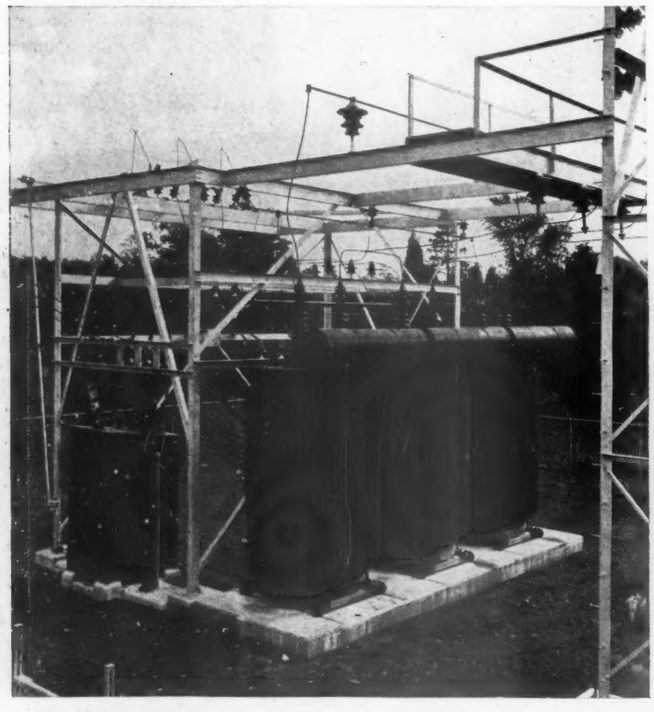
A Bucyrus-Erie 50-B, 2-cu. yd., electric shovel loads the marble into Easton, side-dump cars. The shovel is direct-current-motor-operated, from a 2300-v., 4-unit-motor generator set on board. The motors are entirely controlled by varying or reversing the voltage of their respective generators.

Shale is dug directly from the bank by a Bucyrus-Erie, 20-B, ¾-cu. yd. shovel equipped with one 40-hp. and one 15-hp., 440-v. alternating-current motors. Ordinary, center-tip, platform cars are used for shale haulage.

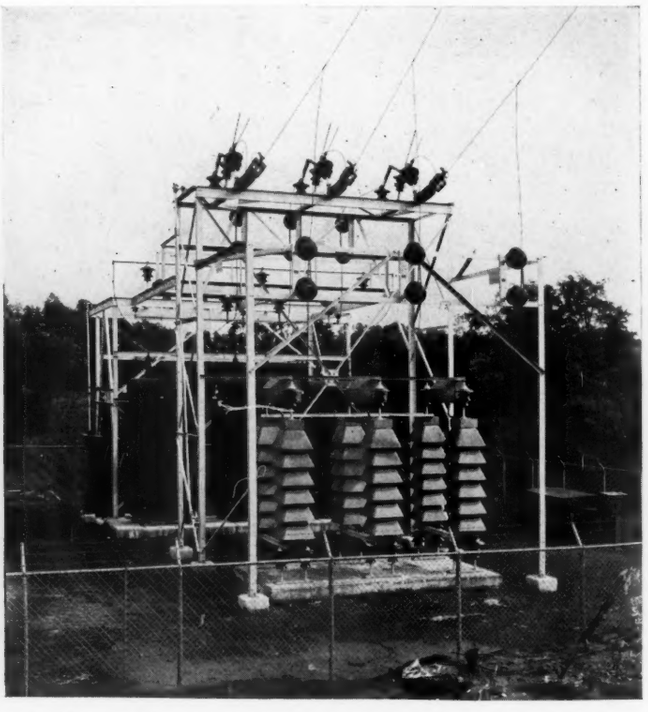
A 25-ton 6-cylinder Whitcomb gasoline locomotive pushes the marble and shale cars up the 2% grade, 2000 ft. and 1500 ft. respectively, to the crusher trestle.

Crusher and Hammer Mills

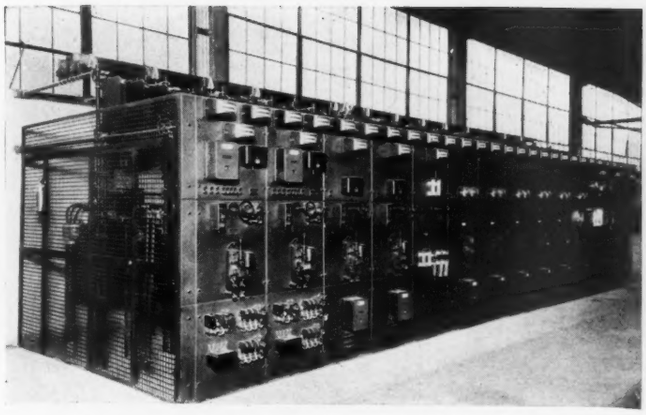
The primary rock crusher is a 36-in. Allis-Chalmers gyratory, belt-driven at 300 r.p.m., by a 200-hp. wound-rotor, induction motor having a full load speed of 690 r.p.m. The 5-in. and smaller marble fragments are con-



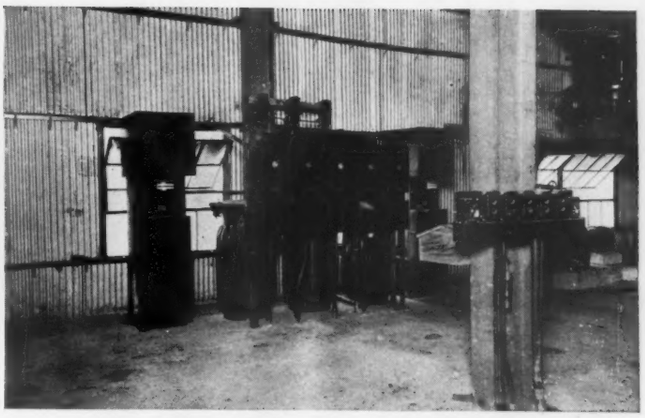
Outdoor substation, 66,000 to 2300 volts, showing step-down transformers and 2300-volt steel switch house



Outdoor substation, 3750 k.v.a. capacity, with 2300-volt switch house step-down transformers and lightning arresters

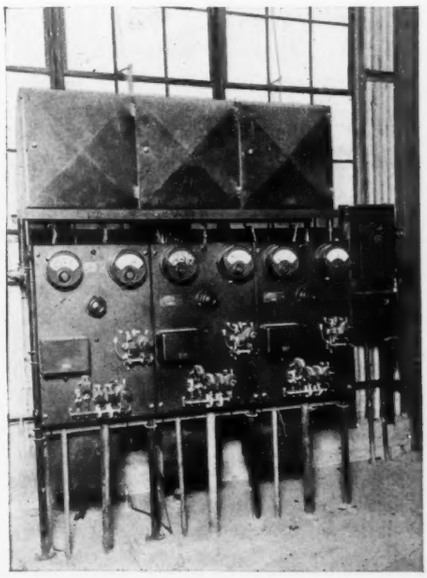


The 14-panel switchboard in the mill room, which is the power distribution center for the whole plant (see diagrammatic sketch on p. 35)



Group of magnetic control panels for the kiln room motors, with 2300-400-volt transformers at the rear, protected by fused disconnects

veyed to the hammer mill hopper by an inclined belt conveyor, driven by a 20-hp. squirrel-cage motor. Above the crusher is a short span heavy-duty, electric crane of 25 tons capacity for handling crusher parts. A single part hoist is used for turning and



Magnetic controllers for synchronous motors driving air compressors

freeing rocks in the crusher hopper. The cars are dumped by an air-cylinder operated cable and hook. The "Pennsylvania SXT-11" hammer mill is directly driven by a 250-hp. wound-rotor, induction motor at 875 r.p.m., and its reciprocating feeder is driven by a 10-hp. squirrel-cage motor through a De Laval worm gear reducer. The shale is dumped directly into the hopper of a "Spartan" 50-in. Pennsylvania hammer mill with similar feeder. The mill is driven directly by a 100-hp. squirrel-cage, induction motor at 870 r.p.m.

The rock mill and the shale mill discharge to long inclined belt conveyors which feed into the mill feed hoppers or to storage. The rock conveyor takes a 20-hp. motor and shale conveyor a 10-hp. motor.

Storage Shed

Surplus over the 18-hour capacity of the mill feed hoppers spills to piles in an open storage shed, spanned by a Milwaukee Electric Crane and Manufacturing Co. bridge crane, which reclaims shale, rock, clinker

Outdoor substation, showing oil circuit breaker current and potential transformers and connections

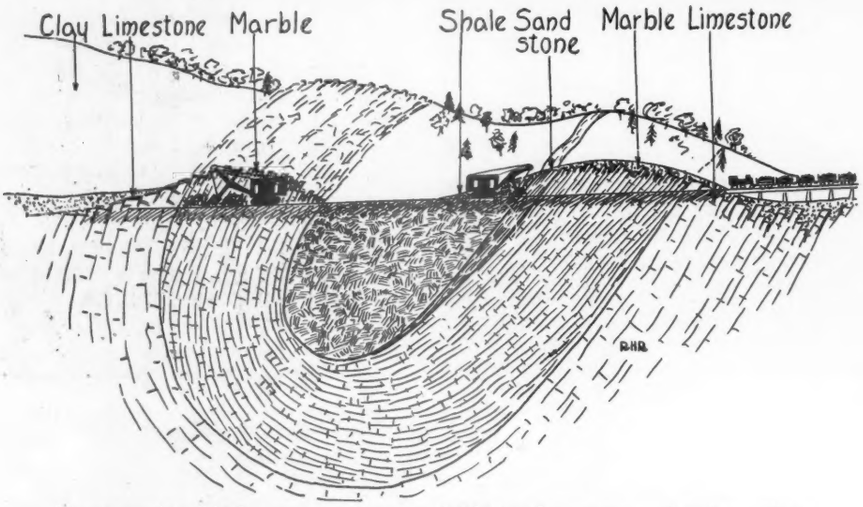
and gypsum and loads these materials into their respective hoppers by means of a clamshell bucket. Gypsum is unloaded to the ground from cars on a trestle inside the storage shed and is fed to the hoppers by the clamshell bucket as described.

Grinding Mill

A service tunnel runs through the mill building and under the clinker storage, containing clinker conveyor, slurry pumps and piping, Fuller-Kinyon cement pumps and transport line, main electric feeder cables, and compressed-air and water-service lines. The whole grinding mill will be described together, though the finish grinding comes out of turn in respect to the flow sheet. There are two raw and two finish grinding mills, each 7 ft. in diameter and 39 ft. long. They are tandem, three-compartment-and-screen, "Unidan" mills furnished by F. L. Smidth and Co. Three sizes of grinding bodies are used, aggregating a load of 50 tons in each mill. Each mill is driven at 20 r.p.m. by a 600-hp., 150-r.p.m., 2200-v. super-synchronous motor through a Bethlehem Foundry and Machine Co. flexible coupling

Outdoor switch house with doors open, showing oil circuit breaker and meter equipment

The quarry at the Knoxville plant, showing the shale shovel at work in the foreground, and the marble face and shovel in the center. The bare rock at the right is marble which extends under a shallow overburden to the elft



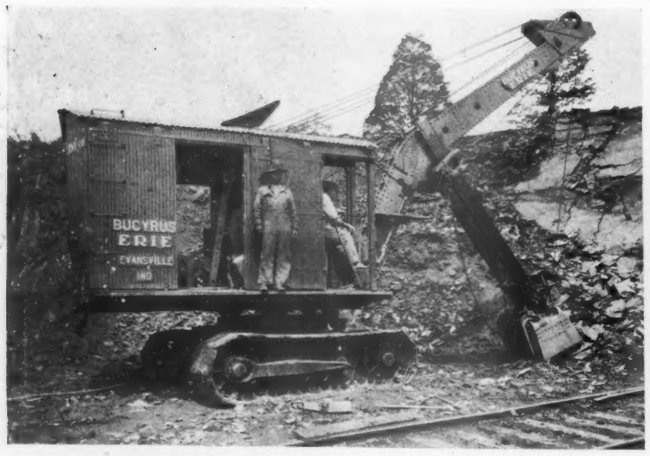
Cross-section of the quarry showing folds in the strata and points where openings have been made

and single, spur-gear reduction.

In these motors, the stator frame is mounted on bearings and is surrounded by a heavy brake band. In starting, the stator is brought up to speed and phased-in, while the rotor and mill are stationary. Applying the brake gradually stops the stator and speeds up the rotor and load, so that when the stator stops, the rotor is up to speed. This type of motor has all its pull-out torque available for starting.

The brakes on these particular motors are applied automatically by a small, direct-current motor mounted on the brake stand. The brake mechanisms are adjusted to take 15 seconds from the time the rotor shafts start until they are up to synchronous speed. The mill motors and brake motors are push-button controlled.

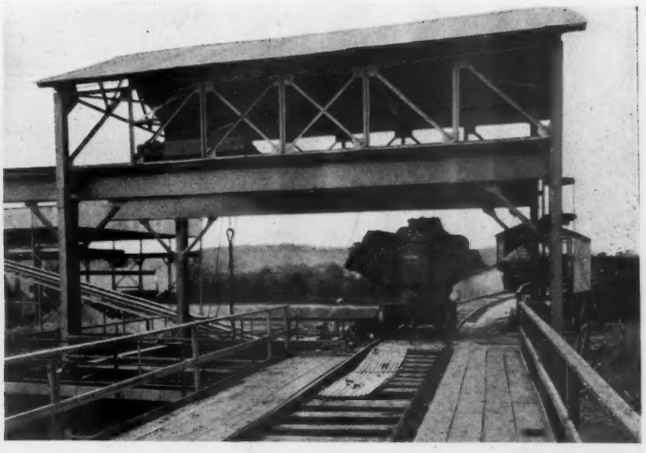
Rock and shale is fed to the raw-grinding



Electric shovel with 3/4-yd. dipper and 23-ft. boom, at work at the shale face, which lies inside of the marble outcrop (see above)

The shovel at work on the marble face has 85-hp. 2300-v. motor in four-unit generator set driving one 60- and two 13-hp. motors. It has a 2-yd. dipper and 30-ft. boom

A 25-ton, 6-cylinder gasoline engine pushing cars of marble and shale from quarries up the 2% grade to the crusher trestle



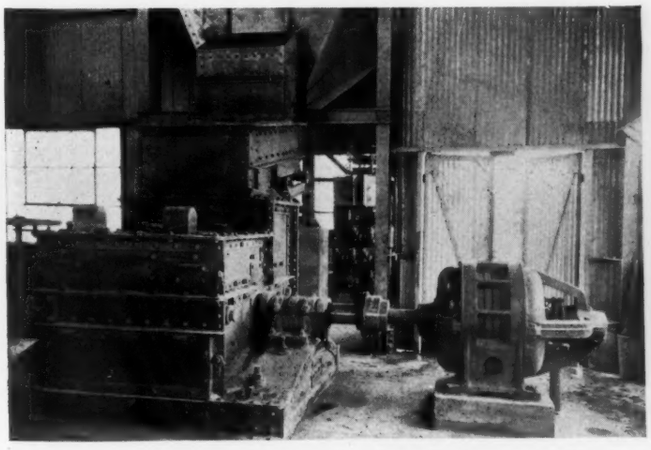
Crusher trestle showing car ready to dump to the gypatory crusher. Overhead is the heavy-duty electric crane used with the crusher

mills, and clinker and gypsum to the finish grinding mills by Schaeffer "poidometers" over American Miag Corp. torpedo conveyors. The poidometer belt feeders, eight in all, are driven by direct-current, three-to-one, speed-range motors, while the torpedo conveyors are driven by 5-hp. squirrel-cage, induction motors. The arrangement is such that the chemist can change only the proportion of mix and the miller can change only the volume of feed.

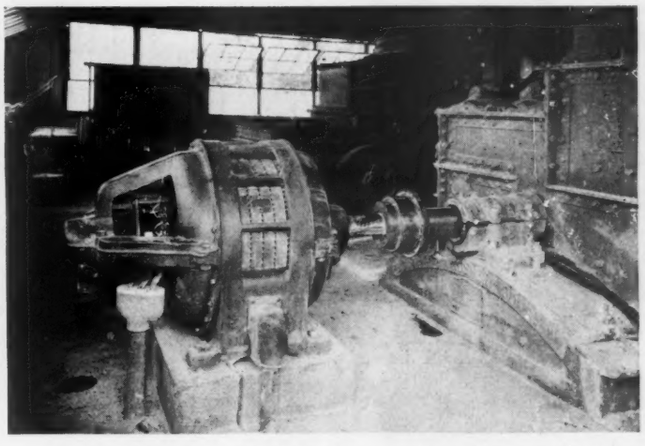
Complete dust-arresting equipment is installed in the grinding mill. In the basement-tunnel between the raw and finish grinding mills are two Wilfley slurry pumps driven by 40-hp., squirrel-cage motors at 1200 r.p.m. They discharge the slurry, which is 35% water, to the three correction tanks. Geared vertical shaft agitators for all three tanks are driven by a 20-hp. double-squirrel-cage motor through a DeLaval reducer. The quadruple mixing basin set lower down and fed by gravity has similar agitators and drives. Two more Wilfley pumps transfer

Secondary crusher house, with shale cars about to dump to shale crusher, and belt conveyor from primary crusher

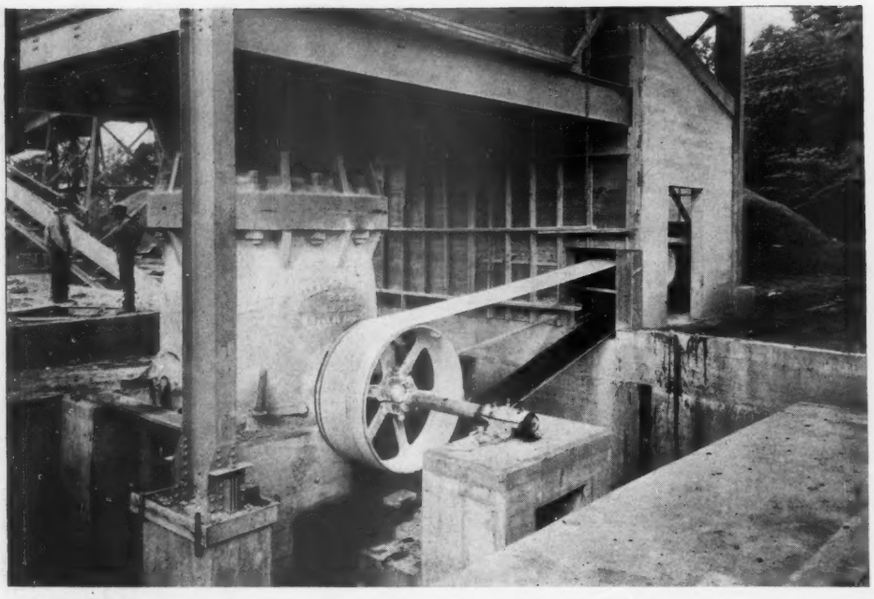
Conveyor belts from the secondary crusher house to the grinder mill bins and storage shed



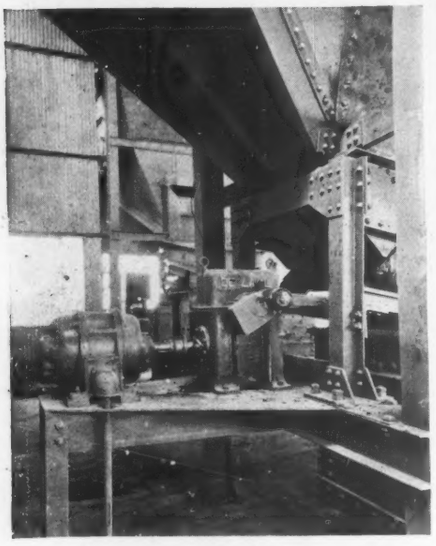
Wound rotor induction motor driving hammer mill operating as a secondary crusher



Motor direct-connected to the secondary hammer mill, showing the shale mill in the background



The 36-in. gyratory crusher driven at 300 r.p.m. by 2200-volt motor



Reciprocating feeder drive for shale hammer mill

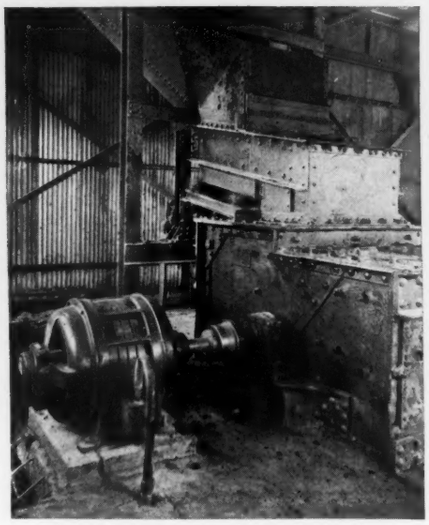
the corrected and mixed slurry to the storage basin. This is an outdoor open tank 100 ft. long, 35 ft. wide and 21 ft. deep, capable of storing 7500 bbl. An F. L. Smidth and Co. traveling bridge agitator spans the tank and utilizes air and mechanical means for preventing segregation. The automatically reversed bridge motion and the mechanical agitators are driven by 7½- and 10-hp. double-squirrel-cage motors, respectively, the latter driving through a Jones reducer.

Kiln House

The two kilns are of Vulcan Iron Works make and are 10 ft. in diameter and 215 ft. long. They are each driven at 1 r.p.m. constant speed by a 50-hp., 900-r.p.m., squirrel-cage motor through a Link-Belt chain and four spur- and gevel-gear reducers. In regular operation they show the remarkably low load of 25-hp. each. The pulverized coal feeders and the Ferris wheel slurry feeders are driven by three-to-one speed-range, direct-current motors having drum switch controls located close to the fire. The primary air and coal blowers, furnished by the American Blower Co., are driven by 20-hp. squirrel-cage motors.

The coolers are of the American Miag type furnished by the Traylor Engineering and Manufacturing Co. They contain clinker break-up screens, and the clinker is effectively sprayed through the cooling air from pocket-shaped buckets riveted to the inside of the shell. They are driven by 30-hp. double-squirrel-cage motors through Traylor reducers.

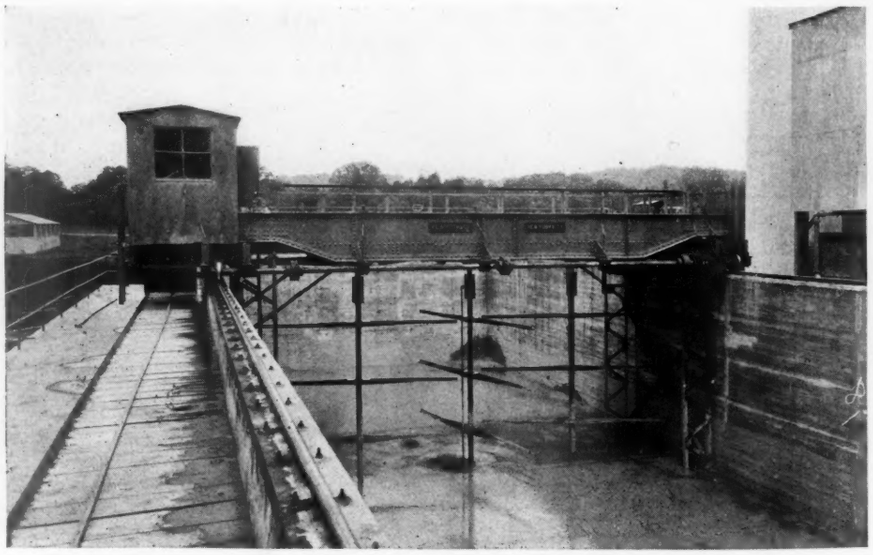
The two coolers discharge to a single torpedo conveyor 150 ft. long, which extends through a tunnel under the storage shed to a vertical, bucket elevator in the mill room. The conveyor is driven by a 10-hp. squirrel-cage motor through a DeLaval reducer. The American Miag torpedo conveyor consists of a motor-driven, flywheel crank and connecting rod which gives a 9-in. reciprocating motion to a long skeleton car. The conveyor trough is hung below the car on short, swing rods. The trough tends to swing back and forth much farther than does the actuating



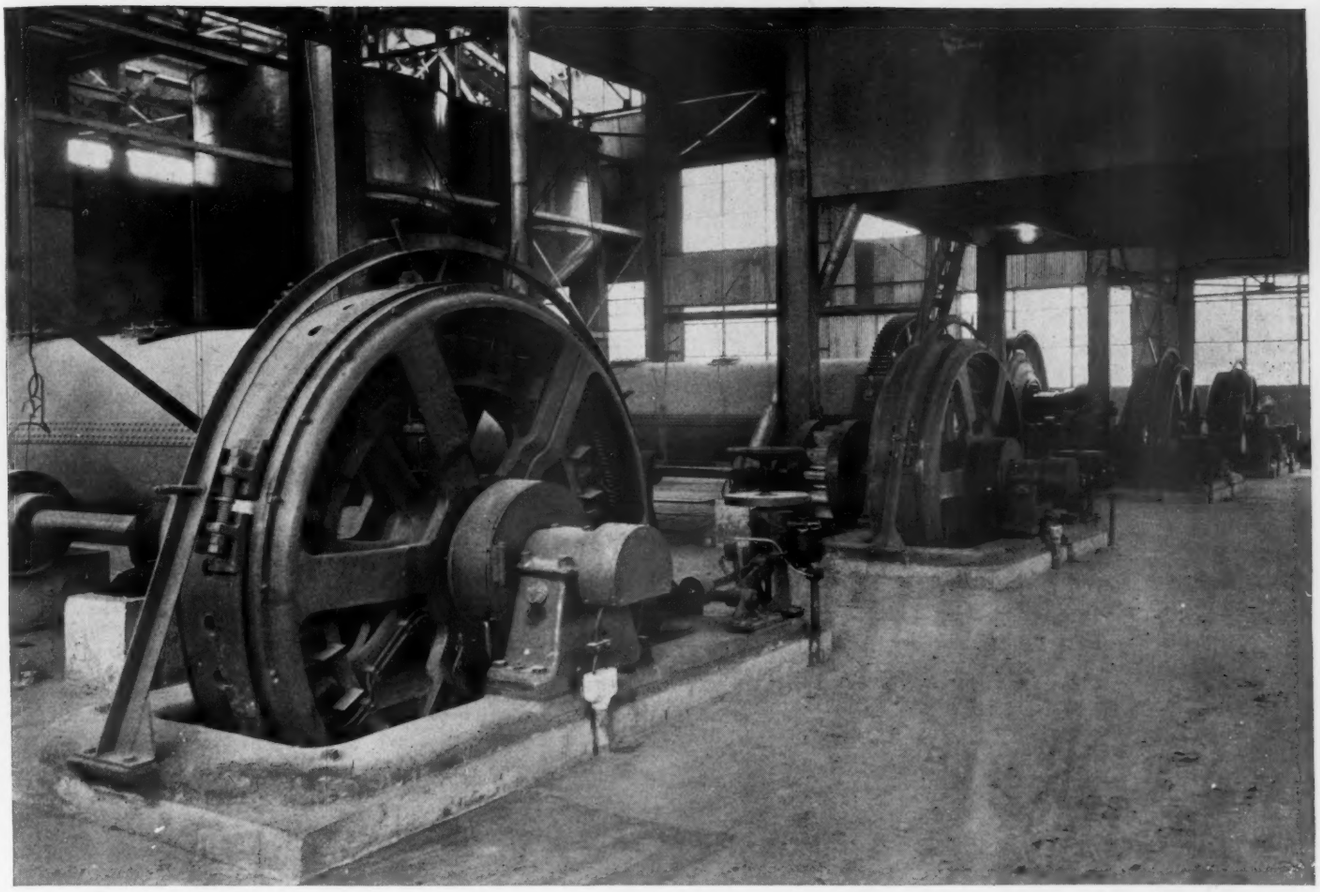
Squirrel-cage motor driving 50-in. hammer mill for crushing shale

car, but its swing in the feed direction is quite suddenly checked by an air cushion. This pitches the contents up and on just as it is done with a hand shovel. The strokes occur about 52 to the minute, enabling the trough to handle more than 3000 bbl. of clinker per day, with capacity to spare.

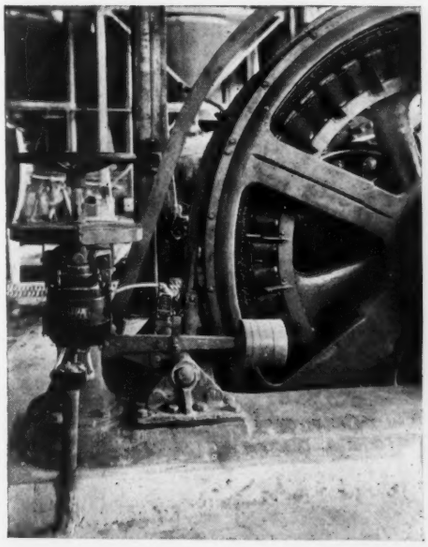
The clinker bucket elevator is driven by a 20-hp. squirrel-cage motor, and it discharges into a torpedo conveyor with a 5-hp. motor, which delivers the clinker to the hop-



Slurry storage tank 100x35 ft. and 21 ft. deep, spanned by slurry agitator bridge



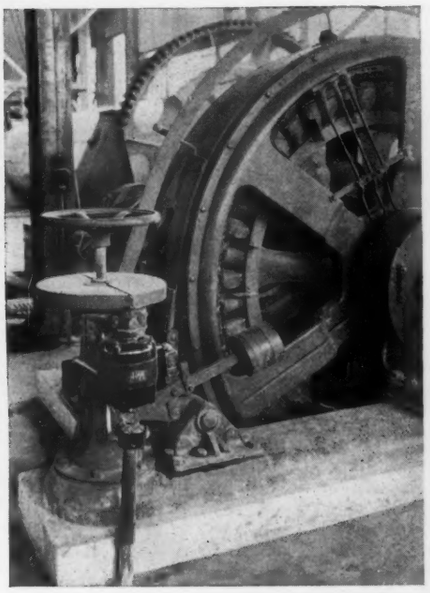
Raw and finish grinding mills driven by motors with automatic brakes, through single spun gear reduction to 20 r.p.m. by flexible couplings



Automatic d.c. motor-driven brake mechanism on super-synchronous motor driving grinding mill, showing brake released

pers over the finish mills. Excess clinker is bypassed to storage.

Between the kilns and coolers there is located a hot-clinker, drag-chain conveyor with a 10-hp. motor, which also drives the hot-clinker elevator. The elevator discharges hot clinker into the storage shed, in case of a shutdown of coolers or of elevator and conveyor system to the mill.

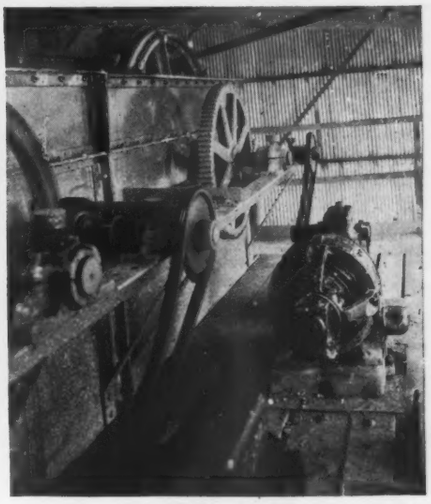


D.c. motor-driven automatic brake for super-synchronous motor on grinding mill, showing brake applied

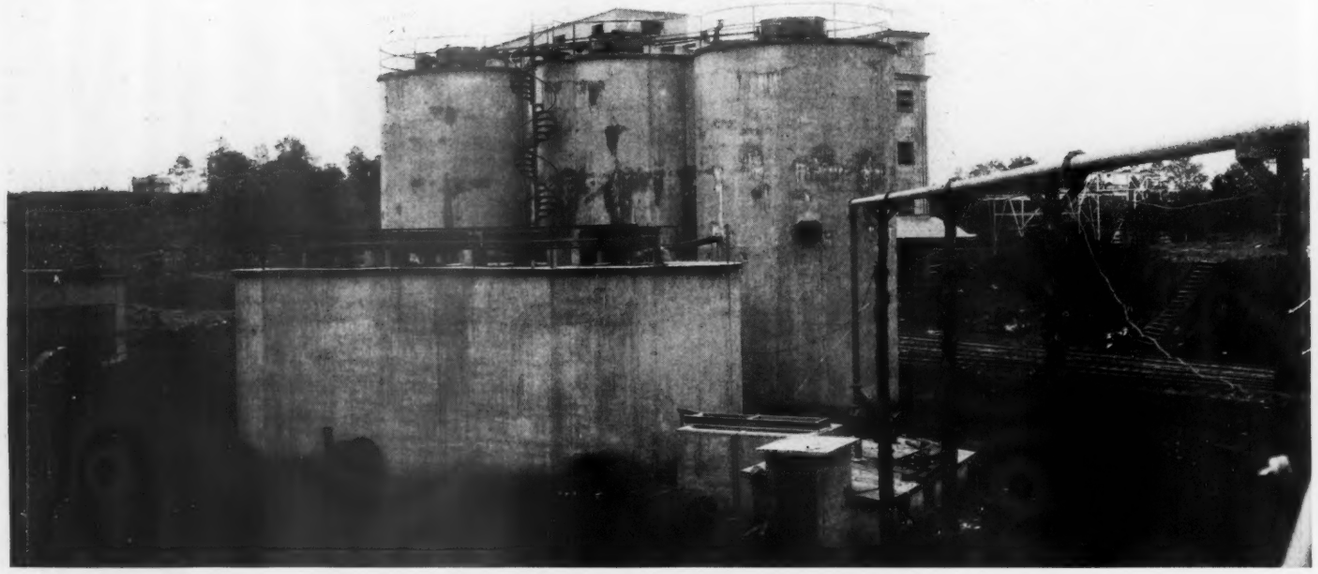
Cement Handling, Storage and Packing

Two Fuller-Kinyon compressed-air pumps, one of which is a spare, in the basement-tunnel between the raw and finish mills deliver cement to the silos. The pumps are driven by 75-hp., 900-r.p.m., squirrel-cage, direct-connected motors through Falk couplings. There are 14 silos arranged about a rectangular interspace, which is also used for storage. The total capacity of the silos is 100,000 bbl.

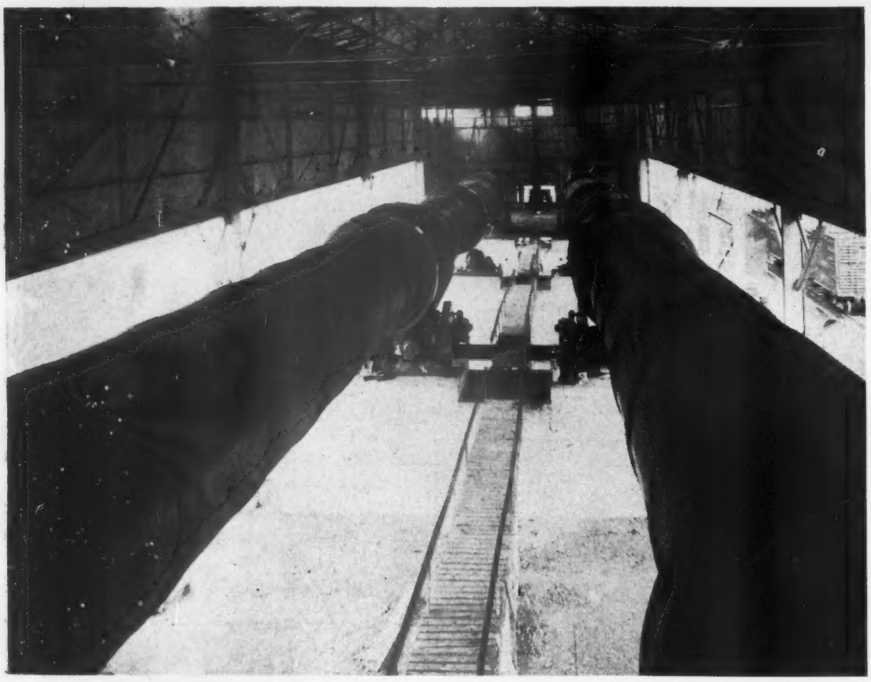
The 4-story pack-house joins the silos. It



Motor driving Ferris wheel feeding slurry to the kiln



Three slurry correction tanks and mixing tank. Pumps in the pump house to the right discharge to slurry storage tank



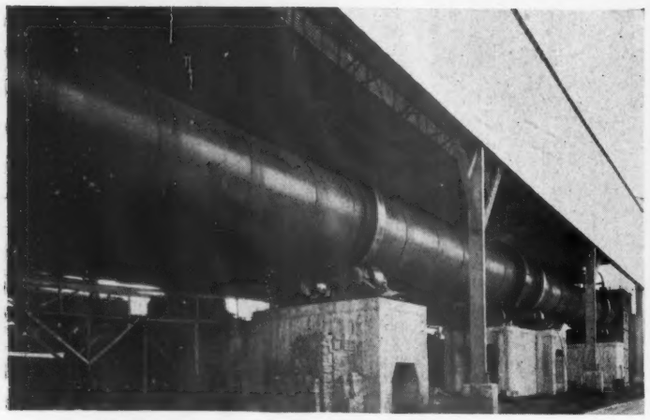
The two 10x215-ft. kilns, showing the firing floor and pulverized-coal hoppers

is equipped with two 3-spout Bates sacking machines, each capable of filling 10,000 bags per day. Each is driven by a 20-hp., squirrel-cage motor. The Western Valve-Bag Co. also furnished a Bates tying machine which can tie 30,000 bags in 10 hours. It is driven by a 1½-hp., squirrel-cage motor.

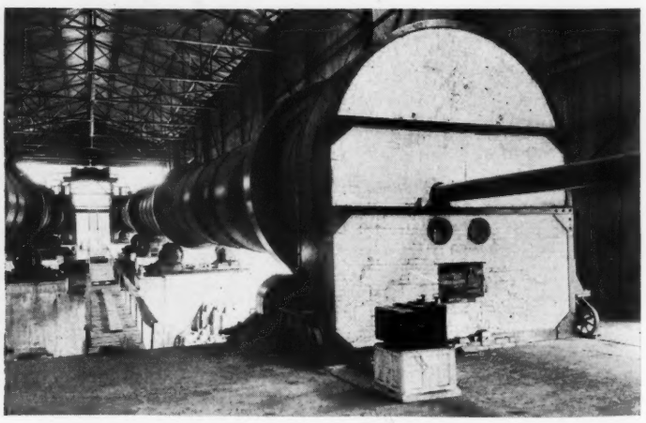
There are three Link-Belt screw conveyors under the silos, each taking a 30-hp. motor, two 10-hp. screw conveyors discharging to the 20-hp. elevating conveyor and a 5-hp. screen. The spill conveyor and the loading belts each take a 5-hp. motor, and the bag cleaner takes a 20-hp., squirrel-cage motor.

Coal Mill

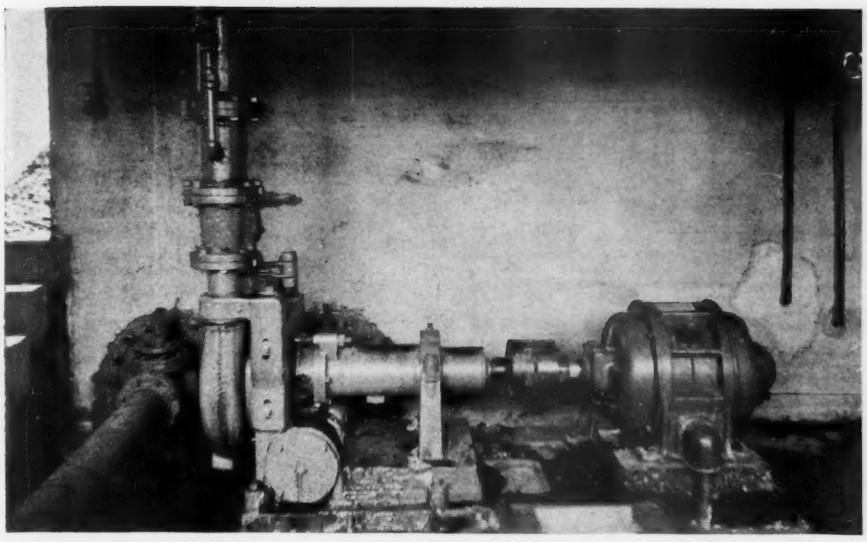
Coal is discharged from cars to an under-trestle hopper, which is emptied by an inclined conveyor, and it in turn feeds into a Jeffrey single-roll, coal crusher. The conveyor and crusher have a single-drive using a 30-hp., belted, squirrel-cage motor. The crushed coal can be discharged directly to the hopper, which feeds the plant, or it can be hauled out to storage by a Crescent power drag scraper. The scraper reclaims the coal.



View of one of the kilns near the coal mill



Firing end of kiln showing portable control stand

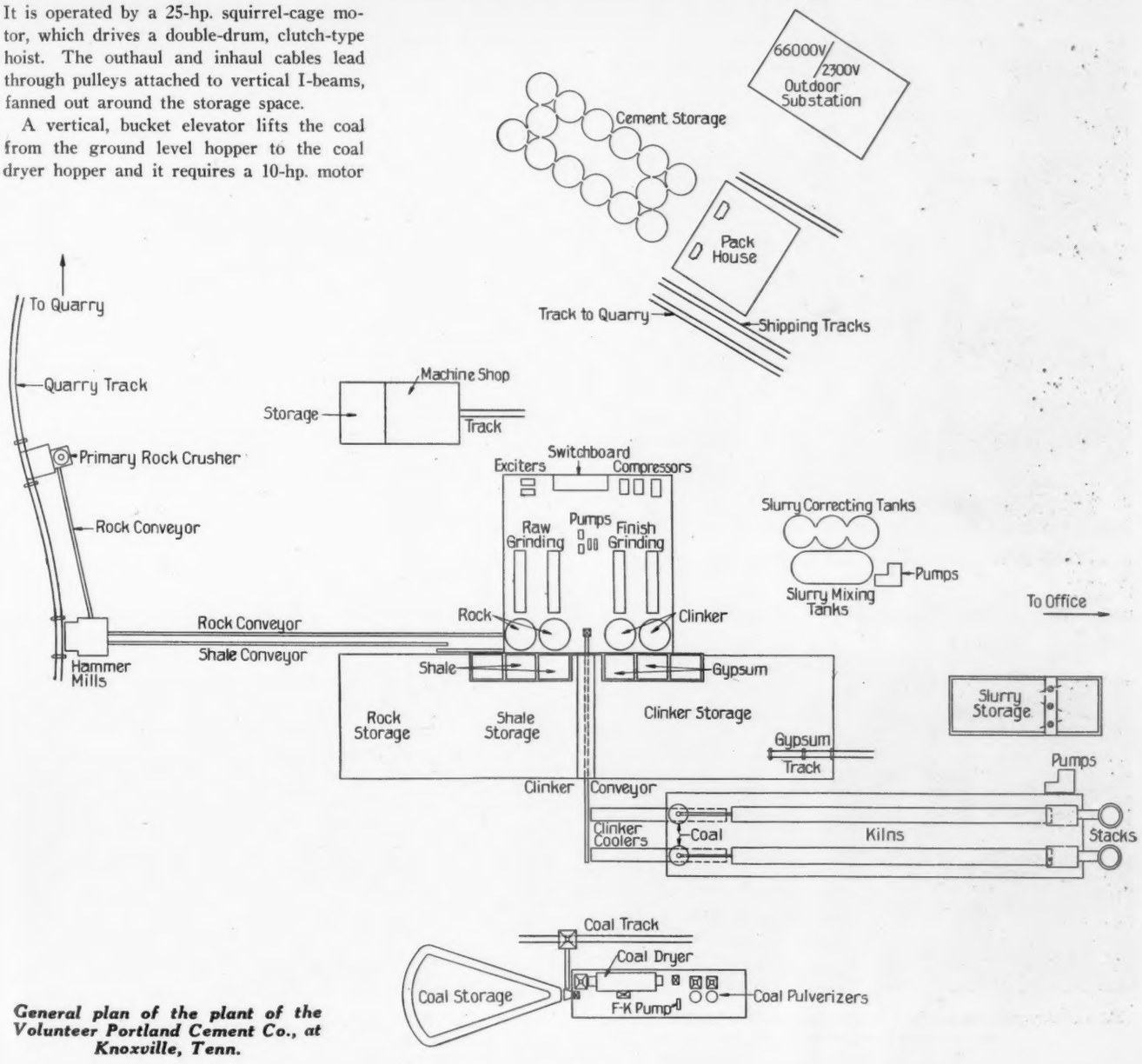


Squirrel-cage motor direct-connected to slurry pump between slurry storage tank and Ferris wheel slurry kiln feeders

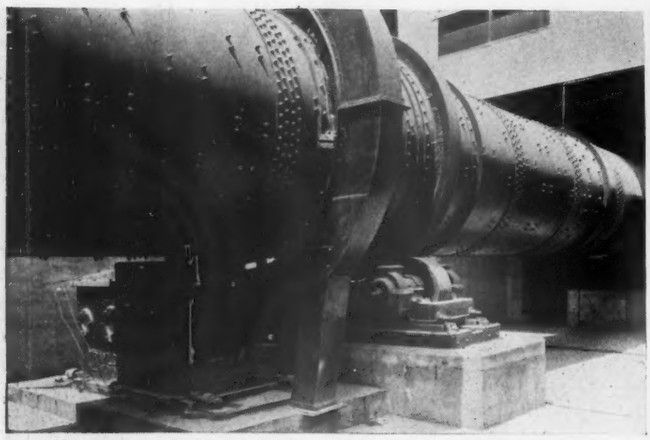
It is operated by a 25-hp. squirrel-cage motor, which drives a double-drum, clutch-type hoist. The outhaul and inhaul cables lead through pulleys attached to vertical I-beams, fanned out around the storage space.

A vertical, bucket elevator lifts the coal from the ground level hopper to the coal dryer hopper and it requires a 10-hp. motor with DeLaval reducer. Coal is fed to the dryer by a 3-hp. adjustable-speed, direct-current motor. The Fuller-Lehigh dryer is driven through a Jones reducer by a 20-hp., 900-r.p.m. motor which drives the dryer at 18 r.p.m. The dryer exhaust blower is driven by a variable speed wound-rotor, induction motor rated 20-hp., 1200/600 r.p.m. A vertical, bucket elevator and a horizontal conveyor feeds dry coal to the two Fuller mill hoppers. Direct-current, adjustable-speed motors driving through silent chains feed the Fuller mills, which are driven by 125-hp., 2200-v., 514-r.p.m., squirrel-cage motors through Falk couplings. A horizontal screw conveyor delivers the pulverized coal to the Fuller-Kinyon pump. The conveyor is driven by a 5-hp. motor through a DeLaval reducer. The pump is driven by a direct-connected, 30-hp., 1200-r.p.m., squirrel-cage motor through a Falk coupling.

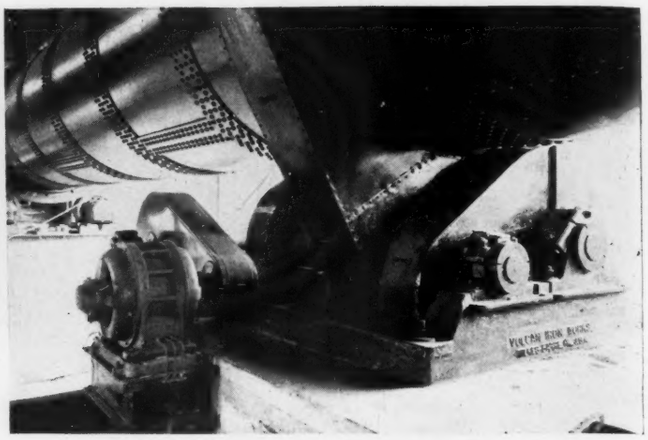
The pulverized coal is pumped to the kiln hoppers and to the dryer furnace hoppers.



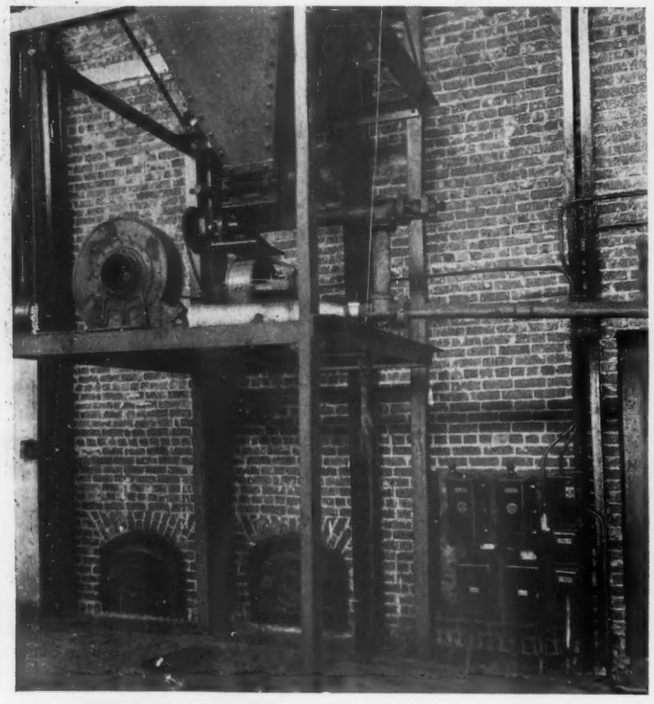
General plan of the plant of the Volunteer Portland Cement Co., at Knoxville, Tenn.



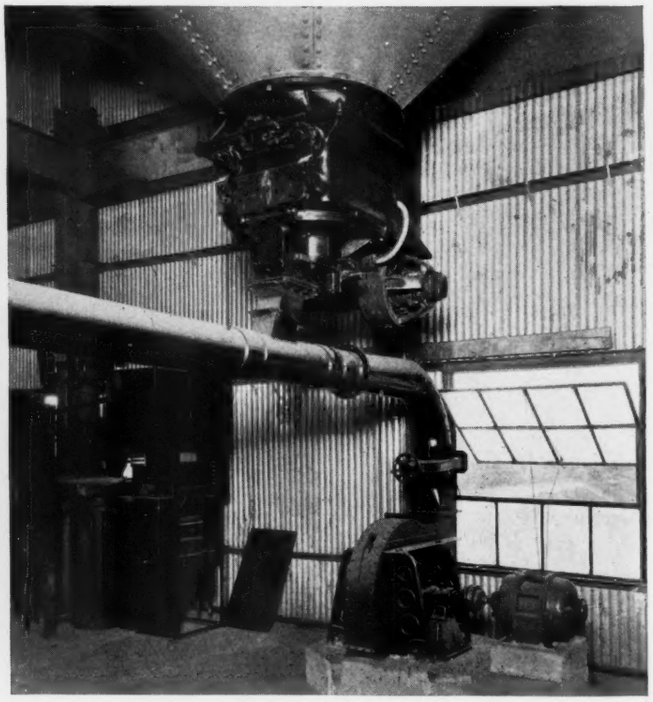
Clinker cooler, driven through reducing gear, has special construction to cascade hot clinker



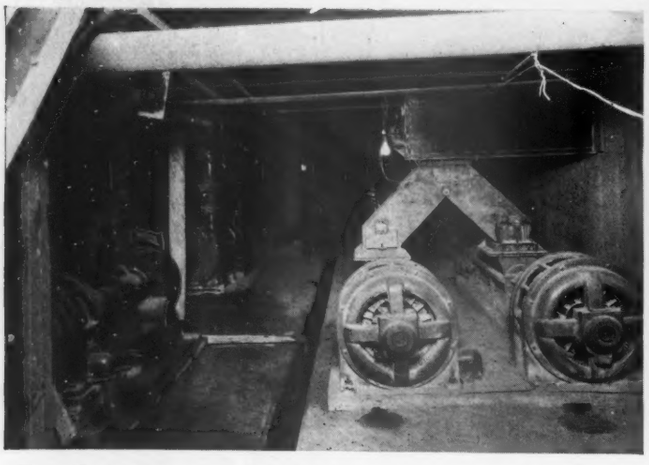
One of the two kiln drives, through a chain and 4-spur and bevel gear reducers having a total gear ratio of 865:1



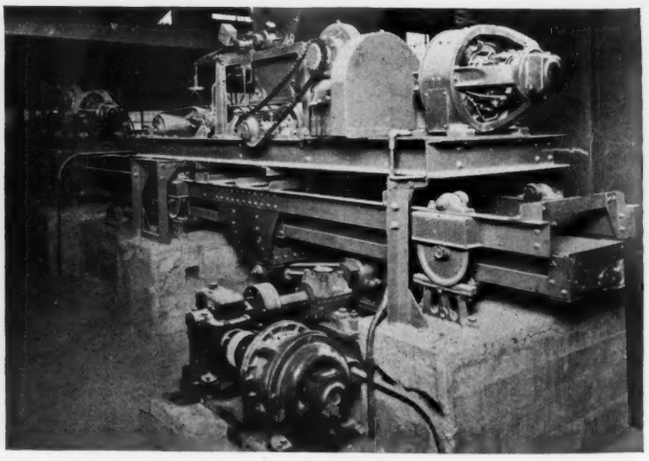
Motor driving pulverized coal feed to dryer furnace



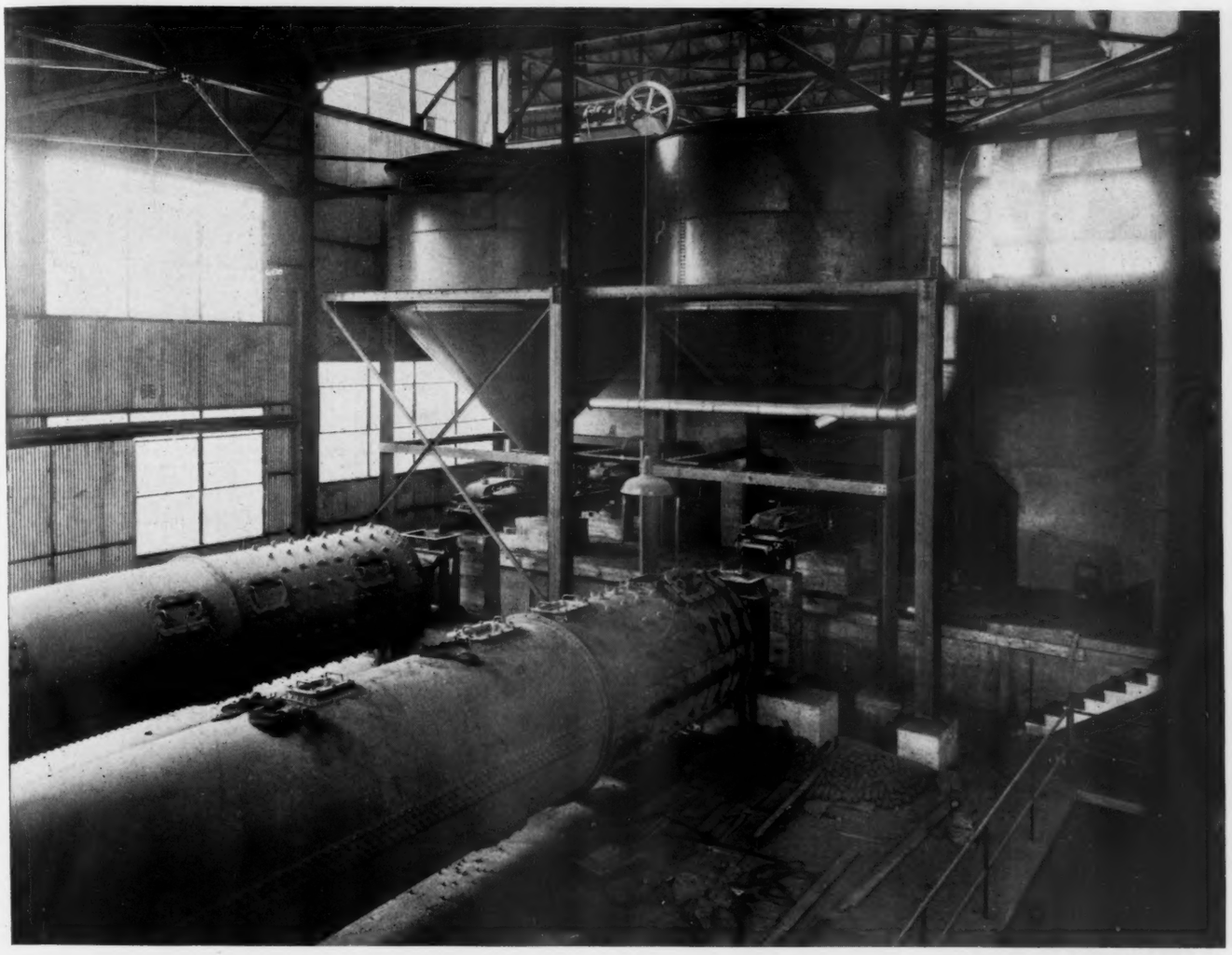
Pulverized coal feed for kiln driven by a 220-volt motor



Two slurry pumps, on left, in the basement of mill building; two cement pumps on the right



Two of the eight automatic weighers feeding four grinding mills, two with shale and marble, two with clinker and gypsum



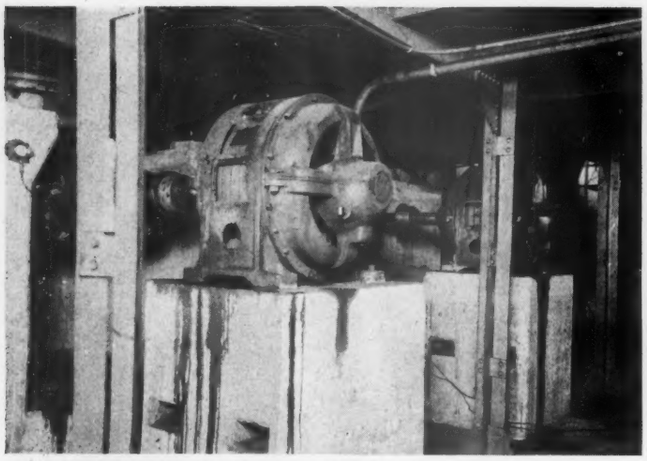
Two-compartment finishing grinding mills showing automatic feeders and weighers and clinker bins

Coal storage and power drag scraper at the right for reclaiming

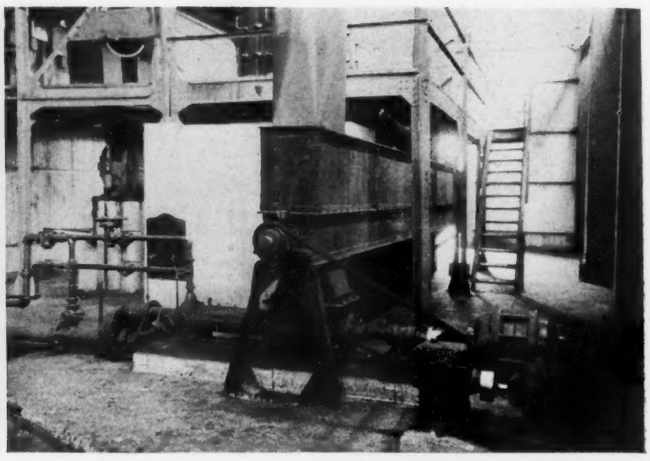
An automatic system of signal lights shows when the hoppers are full.

The dryer furnace is fed by a direct-current, adjustable-speed motor and the primary air blast is furnished by a direct-connected induction-motor-driven blower.

Elevator taking pulverized coal from hopper under cars to coal crusher



Squirrel-cage motors driving coal pulverizing mills



Screw conveyor feeding pulverized coal from mills to the pump

The exhaust fan for the dryer discharges through a cyclone collector, and all elevators and conveyors are equipped with vent stacks, making the coal mill building remarkably free from dust.

Practically the whole coal mill equipment was furnished by the Fuller-Lehigh Co.

Miscellaneous Equipment

There are three air compressors located in the grinder room. They furnish air for the Fuller-Kinyon pumps, slurry agitators, rock-car tipple, and for general use. They are cross-compound, Ingersoll-Rand machines, one No. 11, 18x24-in., and two No. 9¼, 15x12-in. They are driven by built-in synchronous motors, the largest taking 175 hp. at 257 r.p.m., and the others 125 hp. each at 277 r.p.m.

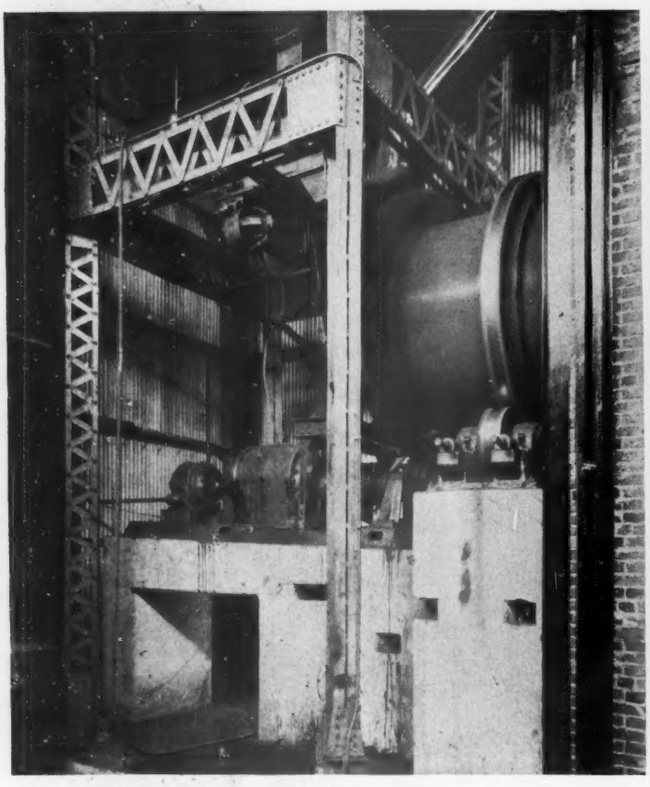
The machine shop contains a Nazel Engineering Works electric-air forging hammer equipped with a 30-hp., geared, squirrel-cage motor. The machine shop is equipped with individually motor-driven machine tools and a portable General Electric arc welding set.

Two Northern Blower Co. dust-collector fans in the finish grinding section are driven by one direct-connected 40-hp., 1200-r.p.m. motor. Two dust-collector fans in the packhouse are driven by direct-connected 15- and 20-hp. motors at 1200 r.p.m.

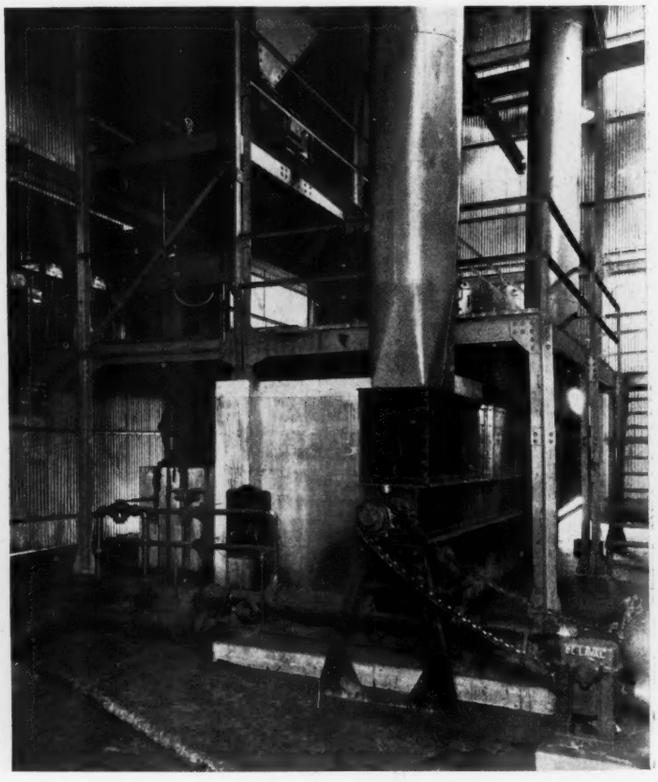
Power Distribution

The 2300-v. service comes from the Knoxville Power and Light Co.'s substation through an oil-circuit breaker having 40,000 amp. capacity for one second, and a rupturing capacity of 17,500 amp. The 2300-v. bus is tapped off back of the switchboard for each department through oil-circuit breakers, which are duplicates of the above. All motors 50 hp. and over are for 2200 v., all other alternating-current motors are for 440 v. Each department has its own 2300-v./440-v. transformers and they are protected by fused disconnects.

There are ten small 110-v. lighting trans-



Coal dryer driven at 18 r.p.m. through speed reducer



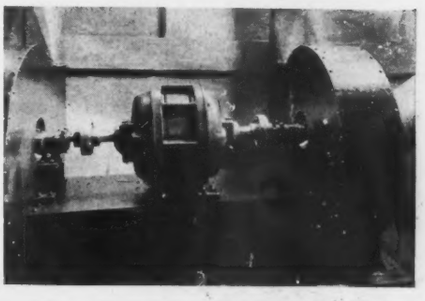
General view of the coal-pulverizing plant

View through the storage shed from the slurry storage tank showing the bridge crane in the background

formers. Two synchronous generating sets, each of 60-k.w. capacity, supply excitation for synchronous motors and power for the direct-current motors. One set furnishes excitation for the raw grinding mill motors and direct-current power, the other set furnishes excitation for the finish-grinding, mill motors and direct-current power. Either set can carry both loads. Each synchronous motor, driving air-compressors, has its own belted exciter.

In general, push-button actuated magnetic controllers are used for all the alternating-current motors. Motors 50-hp. and above

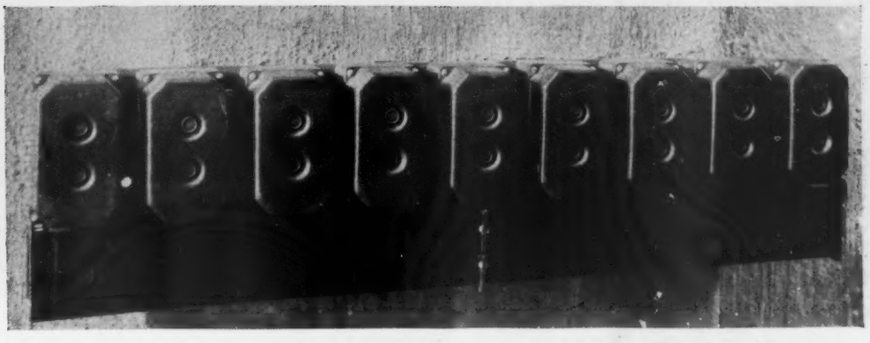
Electric-air forging hammer



Two dust-collector fans on the mezzanine floor of the grinder building

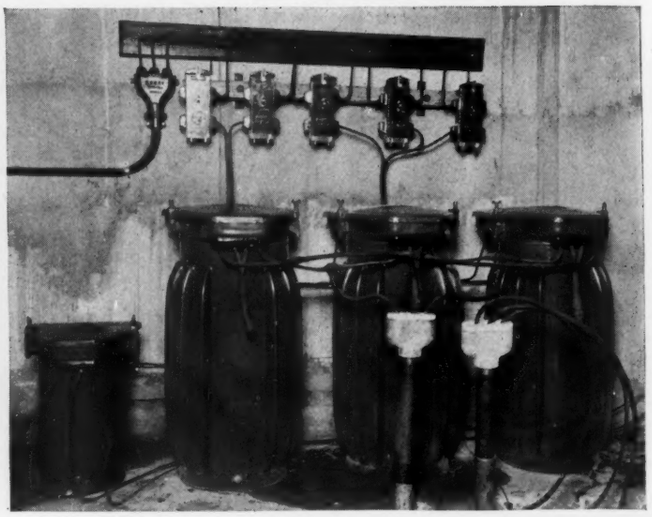
are started on reduced voltage using a 65% tap. Smaller motors are thrown directly across the line for starting. The direct-current motors are controlled by drum switches, combining starting and speed-adjusting functions. Drum-switch control is

One of the pair of 3-spout packers, each of which can sack 10,000 bags per day



Group of nine push-button stations for controlling pack-house motors

Fused jack-type disconnecting switches combined with magnetic switches are unit starters for pack-house motors

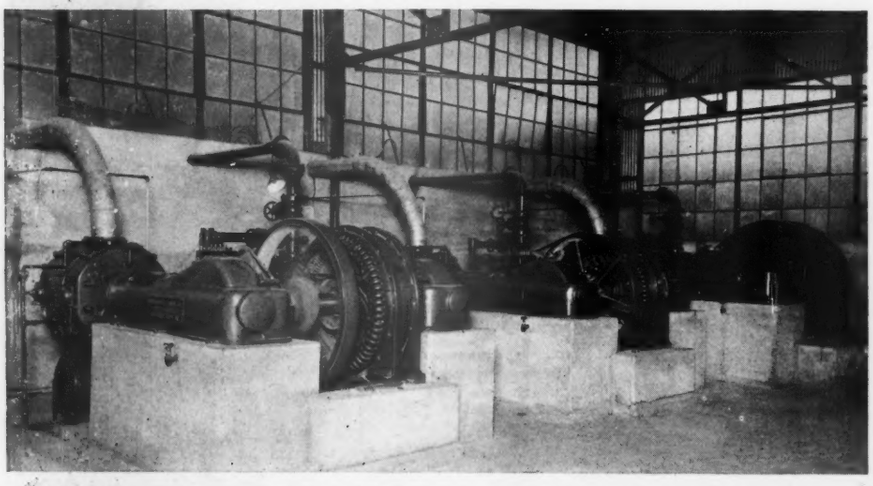


Transformers for silo and pack-house feeders and lighting transformers for the same buildings

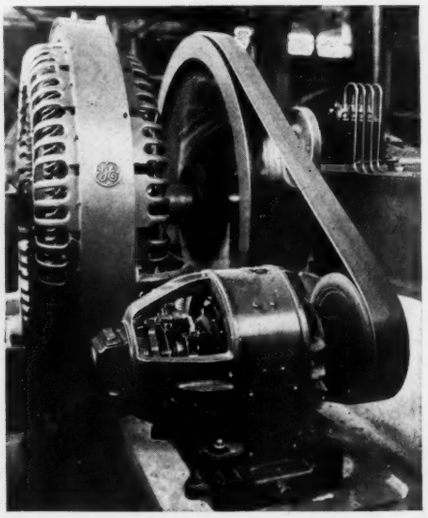
also used on the 1200/600-r.p.m. dryer-exhaust, wound-rotor, induction motor. All motor controllers embody overload and undervoltage protection, utilizing thermal overload devices in most cases.

Motors are divided as follows:

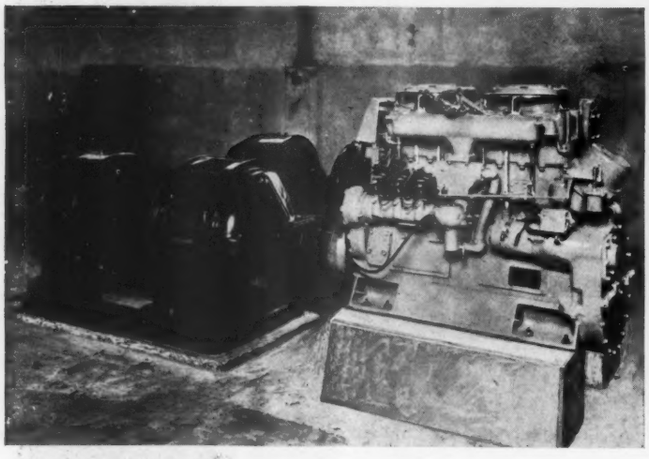
	Number	Total hp.
Synchronous	9	3225
Wound-rotor, induction	3	470
Squirrel-cage, induction	65	1600
Double-squirrel-cage, induction	4	120
Direct-current	14	42
	94	5457



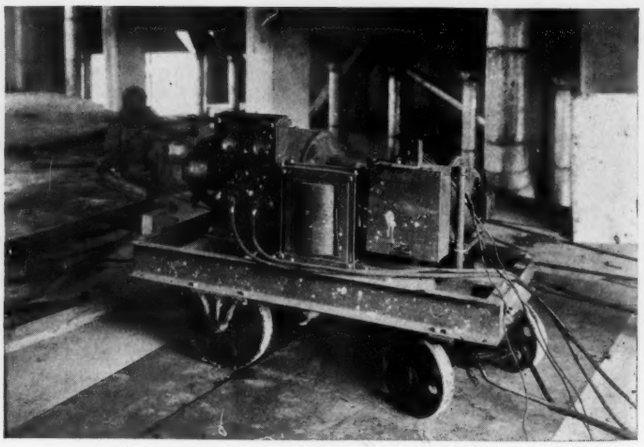
Air compressors supplying air for pumps and slurry agitation, driven by synchronous motors



Exciter for air-compressor motor



Gasoline engine direct-connected to motor generator set, and used to drive a generator to provide power to keep kilns operating if other power is cut off

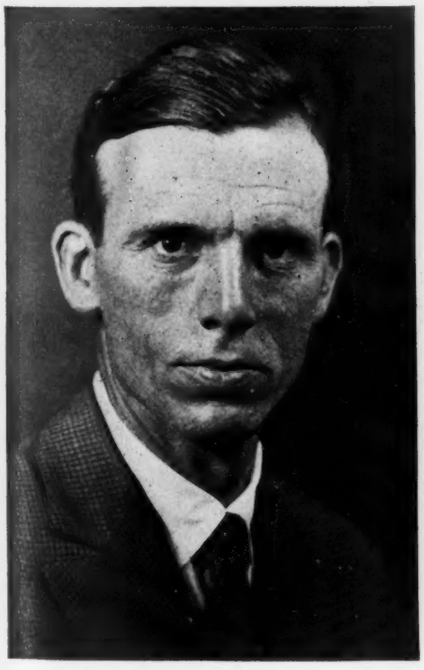


A part of the shop equipment is an arc welder, shown being used to build hoppers for bagging machines

Howell J. Davis, vice-president

The crane and shovel motors and a few others are not included in this list.

Power distribution is marked by complete segregation of electric power circuits to serve various manufacturing departments to facilitate the keeping of cost data and to limit the amount of machinery shut down in case of repairs, and by the installation of



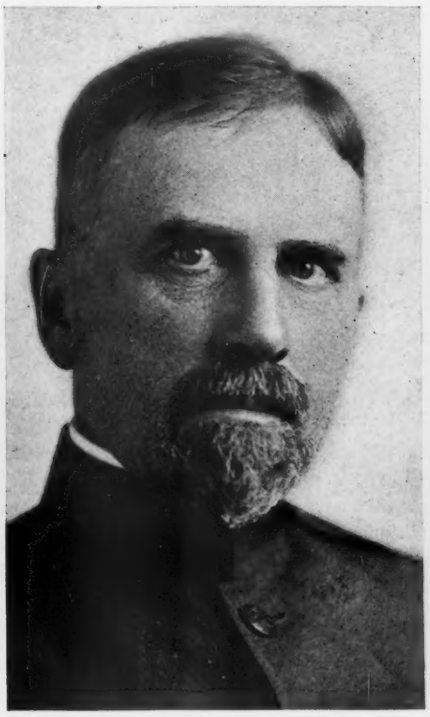
Walter E. North, engineer

J. Ross Hanahan, president

jacks on all motor starting panels to provide means for testing motors without interrupting operation.

Construction Work

The mill construction work was much subdivided and a large amount was done by Volunteer company's forces. The Burrell Engineering and Construction Co. built the two 175-ft. stacks, the slurry tanks, the storage silos and the pack-house. The steel buildings were furnished by the Virginia Bridge Co., and the Ingals Iron Works.



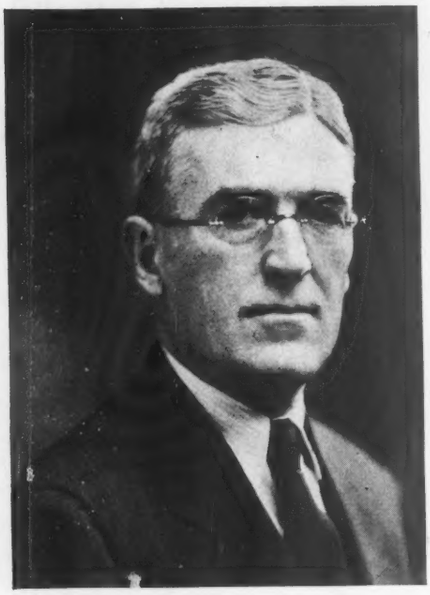
Major Frederick H. Lewis, consulting and construction engineer for the Volunteer company

E. Earl Evans, secretary and treasurer
Walter E. North, engineer

Concrete work for clinker storage, building and machinery foundations, and small buildings was built by the A. R. McMurray Contracting Co.

A roomy dwelling house, that was on the property, has been renovated and subdivided

Major Charles F. Lewis, manager of the plant



F. C. Parsons, sales manager

for the factory office. A marble bungalow, which was also on the property, has been converted into a laboratory.

Considerable trouble developed in foundation work because of the irregular up-ended limestone strata underlying from 10 to 30 ft. of slippery clay, with occasional pockets going much deeper. The grinding mill foundation and the silo foundation were carried to rock. Foundations not carried to rock were spread to keep the soil pressure down to 2000 lb. per sq. ft. Steel sheet-piling was placed about the chimney foundation and the intervening space was filled with concrete. Installation of machinery, electric wiring, motors and control was carried out by the Volunteer company forces.

Ground was broken about the middle of June, 1927, and clinker was made May 13 and cement on May 15, 1928.

Personnel

The president of the Volunteer Portland Cement Co. is J. Ross Hanahan of Charleston, S. C. He is also president of the Carolina Portland Cement Co., and of the Planters Fertilizer and Phosphate Co. Mr. Hanahan is thoroughly familiar with southern markets, finances and industries. The vice-president is Howell J. Davis, a resident of Knoxville. He is also president of the East Tennessee Coal Co. and a director of the Bankers Trust Co. of Knoxville. E. Earl Evans is secretary and treasurer. He was formerly comptroller of the city of Charleston, S. C., and he has also been treasurer of the Commission on Public Works.

Major Frederick H. Lewis is consulting and construction engineer and is also a director of the company. He is prominent in the various engineering societies and has been engaged in the construction and management of cement plants for over 20 years.

His son, Major Charles F. Lewis, is manager. He has been associated with cement plants from boyhood, is a graduate of the University of Pennsylvania, and became a major of engineers during the World War. He has been superintendent and assistant superintendent of prominent Southern cement plants and companies. F. C. Parsons is sales manager, with offices in Knoxville.

Walter E. North is engineer and he has had much to do with the general mill planning and selection of equipment. He has been connected with mills in the Lehigh district in engineering capacities for a number of years.

C. A. Moser is mill superintendent, C. S. Branscomb is chemist, and E. E. Calloway is chief electrician.

The entire personnel will number about 125 men and the labor contingent is made up of intelligent native white descendants of the early Scotch-Irish settlers. The claim is made that in East Tennessee native American stock forms a larger percentage of the population than is the case in any other similar area in the country.

All who have had a hand in the new enterprise are justifiably proud of the Volunteer plant, and the company is especially cordial in inviting inspection by the general public and by those more intimately connected with the portland cement business.

The two 175-ft. chimneys at the end of the kiln house

Standards Yearbook for 1928

THE new Standards Yearbook, compiled by the National Bureau of Standards, contains outlines of the activities and accomplishments of the National Bureau of Standards and other government associations, foreign standardizing agencies, technical societies and trade associations.

The introductory chapter deals with the scope of standardization and its necessity and usefulness in modern progress. The various departments of the United States government, such as the Department of Navy, Department of Interior, and others

Typical bag showing trade mark which the Volunteer company uses

are listed, giving their activities concerning the standardization of materials.

Ninety-four pages are devoted to the technical societies and trade associations of the United States, such as the Portland Cement Association and National Sand and Gravel Association with special emphasis placed on their accomplishments during the year 1927.

A few typical flow-sheets illustrating steps by which standards are made effective to ultimate users are given, which show the lines along which specific magnitudes embodied in the standards of the National Bureau of Standards are passed on with a minimum of error to the laboratories, factories and markets.

Mineral Industry in North Carolina

A RECENT bulletin has been received from the Department of Conservation and Development of the State of North Carolina on the "Mineral Industry of North Carolina for 1924 and 1925." The bulletin gives a complete list of all the minerals of the state and a brief statement of the locations where they may be found, thus providing a handy reference book for those interested in placing or expanding industrial enterprises in that part of the country. In the nonmetallic minerals field there are sections devoted to stone, sand and gravel, mica, feldspar and talc. The portion on stone includes sections on granite, limestone and cement materials, sandstone and marble. For all products, tables showing the production from 1921 to 1925 inclusive are given. Also a list of the principal producers of the material is generally given. The bulletin, which is No. 60, is the work of Herman J. Bryson, acting state geologist.

Sand Settling and Devices for Settling and Classifying Sand

Part VII—Commercial Forms of the Sand Drag

By Edmund Shaw
Editor, Rock Products

IN THE June 23 installment of this series, Part IV, was discussed the elements of the common form of sand drag; in this installment some cemmercial forms of the sand drag will be discussed in some detail.

Commercial Forms

The original belt machines were almost all of them built at the plants at which they were to be used. This can sometimes be done yet to advantage where only a small tonnage is handled, as the various parts are all standard equipment that can be bought from many makers. But where a large tonnage is to be regularly handled the machine should be built by one who knows how to proportion the various parts to stand the strains they must meet and who understands how to protect the bearings and use the right metals for the different parts. For these reasons the commercial drag is a far better machine than the "home-made" affair and will stand up to the work better and cause less lost time from breakdowns.

Practically all makers of sand and gravel equipment and conveying equipment make some form of drag machine, either in a standard form or to order.

Units of Commercial Forms

All commercial forms have the following units: The box or trough in which the sand and water are held, feed and overflow arrangements, a frame resting on the box to support the bearings, the chains and sprockets with their flights, or paddles, and the driving gear. Although the various commercial drags look alike to the casual eye, examination will show that they differ in some or all of the above details, and it is these differences which will be brought out in the descriptions which follow.

One of the oldest commercial drags is the "sand wash box," made by the Good Roads Machinery Co. It is shown in perspective in Fig. 23. The box is not supplied by the makers, but is built at the plant by the customer from drawings furnished. It consists of a timbered frame which is fastened by tie rods and lined with planking. Feed is put in near the center and the overflow is taken off at a tailboard baffle which can be made lower by simply cutting out a board. The drain board projects from the front of the box and is independent from it.

This is regularly made in three sizes and the maker's catalog gives the following table:

Sizes	Tons per hour	HP.
8-ft. box, 18-in. flights....	10	4
12-ft. box, 3-ft. flights....	25	6
18-ft. box, 4-ft. flights....	35	8

The 8-ft. box is regularly equipped with cast iron flights on ½-in. cable. The larger

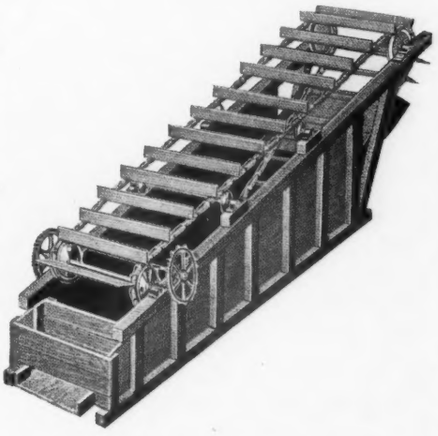


Fig. 23. An early sand drag

sizes have steel flights on chains which may be of manganese-steel if desired.

Regarding the working, the makers say that the spillway gate (overflow) may be regulated to give almost any desired fineness or coarseness to the sand overflowing. They recommend the use of two boxes in series for making two grades of sand, the second box taking the overflow from the first. This is done with all the machines described.

The drive of this machine is through a chain and sprocket and gear. The machine is used in many plants and its work has often been mentioned in plant descriptions in Rock Products.

A Larger Type

In comparison the steel sand drag made by the Link-Belt Co. (Fig. 24) may be noted, as it shows how far machines of this type have developed in size and capacity. The trough or box is of heavy steel plate 30 ft. 3½ in. long and the drain board is made integral with the tank. The slope of this is 27 deg., about as steep as that of any drag noted in practice. The overflow is through an opening in the deep end, the height being varied by blocking off. At the normal height of 2 ft. 6 in. this leaves a long section of the drain board out of water, which, with the steep angle, should make this machine a good dewaterer even when it is run at a fairly high speed. The width of the tank is 5 ft. 6 in. and that of the flights 4 ft. ,allowing ample clearance at the side, and the pulleys are supported on angle irons (which do not show in the drawings). The driven pulley may be moved to take up or increase the slack of the chains, and the drive is through a silent chain and gears.

A study of the design shows that the machine was intended to handle large tonnages and it has been installed in a number of good-sized plants. One notable one is at the plant of the Buffalo Gravel Corp., Buffalo, N. Y., and in this installation is found one of the few novelties that have been introduced in drag design. The flights have been

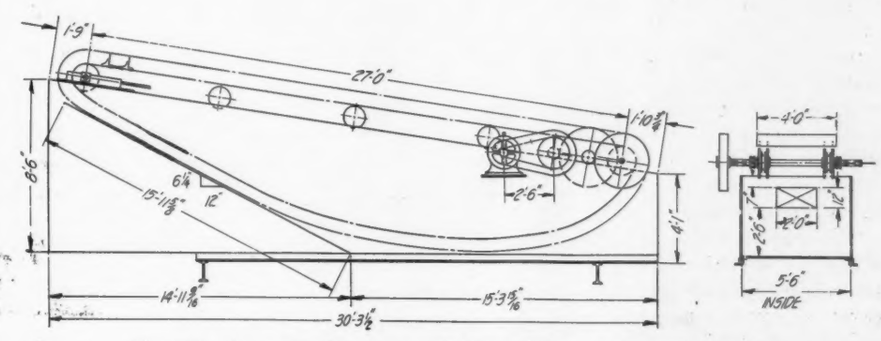


Fig. 24. An example of a sand drag of large size and capacity

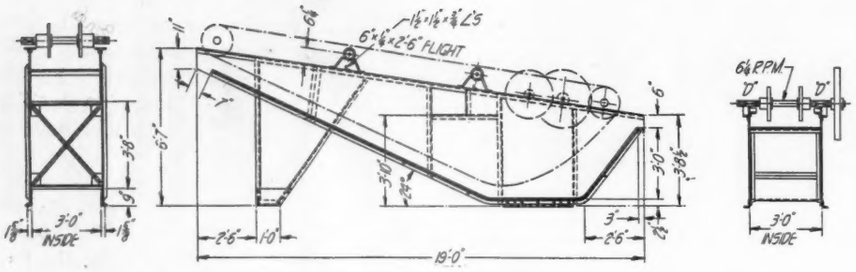


Fig. 25. Another fabricated sand drag of steel construction

given a slight kink or bend, which is said to give better drainage to the sand.

The maximum capacity, working on ordinary building sand, is said by the makers to be 120 tons per hour.

The Greenville Gravel Co. makes a very neat machine shown in a fairly small size in Fig. 25. The trough is somewhat shorter than in the preceding type. It is made of heavy steel plate with angle irons all around and bracing the sides and a heavy angle iron frame above to support the bearings. The drive is through a gear and a belted pulley and the moving parts may be assembled so as always to bring the belt and gears on the opposite side from the feed trough. The pulley on the discharge end is provided with a take-up to regulate the slack of the chain.

The feed is admitted at the side and the overflow is taken off over the end. There are no arrangements shown for raising and lowering the overflow lip, but this could easily be provided for.

A good feature of this design is that the machine has its own supports attached to it.

An Unusual Design

A somewhat unusual design is shown in Fig. 26, which illustrates the drag made by W. H. K. Bennett, of Chicago, for plants of his design. The trough is a wooden tank supported on sills. Posts are set on this and held in place by dowel pins, and these support a wooden frame which carries the pulleys. Inside the frame is the planking which forms the trough.

The unique feature of this machine is that it has no drain board. The space for drainage is formed by the accumulation of sand in the discharge end of the tank, and there may be an advantage in this method, as there is no wear from either the drags or the sand to be cared for. The one objection might be the extra weight.

The design does not show the method of driving, which presumably means that the customer may choose the method most convenient. There is no take-up shown for the pulley on the discharge end, and a take-up may not be so necessary where the sand bed is used for draining.

This machine has the overflow at the side and it is presumed that the feed would be taken in over the end. The overflow can be easily raised or lowered by taking off or adding a board.

main portion being made long and flat-bottomed so that the weight of the contained sand and water will be enough to sustain the downward pull of the drain board and the pulley at the discharge end. The second feature is a removable liner for the drain board, the only part on which there is much wear. The third good feature is a drainage plug of large size at the deep end of the tank. It sometimes happens that a tool or piece of pipe or something of the kind gets into the trough and makes a lot of trouble, and the

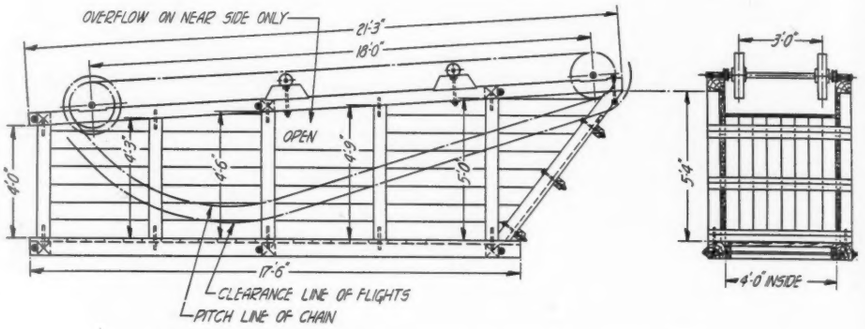


Fig. 26. A somewhat unusual design of a sand drag

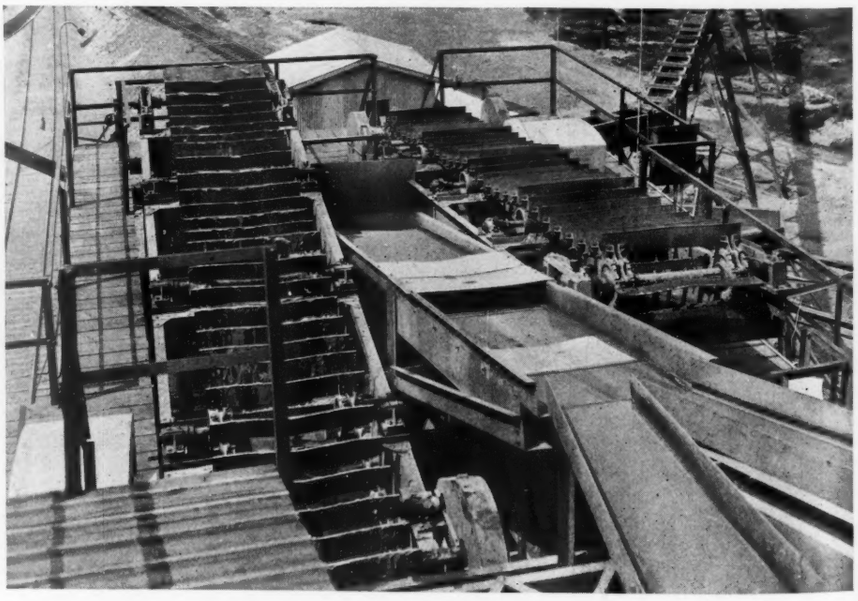
A feature of this machine which not all the others have is that the chain passes over sprockets on the drive end and over plain pulleys at the other end. This practice has been followed by makers of chain elevators and plain flight conveyors to some extent. It has the advantage of allowing the chains to adjust themselves to slight inequalities resulting from wear.

Special Features

The drag made by the Webster Manufacturing Co., shown in Fig. 27, has three special features which should be of value to the operator. The first of these is the self-supporting shape of the trough or tank, the drainage plug provides a method of emptying it quickly so that the obstruction may be removed. This feature, of course, is one that can be added to any drag if the makers do not provide it.

The feed is shown as being put in above the drag in the center, an arrangement that does not appeal to the writer, who would prefer to see it brought in below the chain from the side. The overflow is at the end and has a very neat method of adjustment, a sliding plate which may be raised or lowered when the drag is running.

The Jeffrey drag, made by the Jeffrey Manufacturing Co. and shown in Fig. 28, is made by a concern that specializes in convey-



Example of sand drags at a large sand and gravel plant

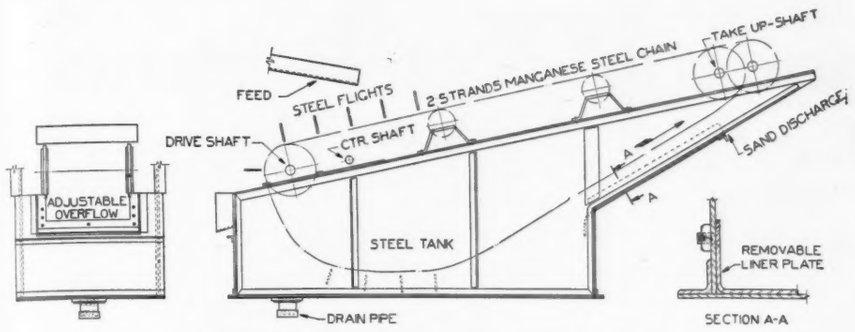


Fig. 27. Sand drag with some special features

ing and elevating equipment. In order to cope with the somewhat severe wear that the chains of drags have to undergo, a special chain has been designed for the purpose, consisting of manganese steel block links.

This drag regularly has a wooden trough or tank which the customer builds from plans furnished by the maker. Steel tanks are furnished when desired, however. It is made in five sizes and the capacities given, supposedly for concrete sand, are 24, 30, 36, 42 and 48 tons per hour.

Some Special Features

A study of the design of this drag shows some excellent features. The feed is put in well forward under the chain. The overflow is at the rear and the height of the overflow is adjustable through screws that may be set while the drag is in use. The frame which holds the front pulley is well supported and the drain board is placed so that it acts as a front support. The drain board is long and has about as steep an angle (27 deg.) as any design shows, so it should have a good dewatering capacity even at fairly high speed. Take-up arrangements are provided for the discharge pulley. As the frame which holds the idlers and front pulley is high above the trough, there is ample room for the feed launder below the chain.

A notable installation of this drag has been made at the newer plant of the Arrow Sand and Gravel Co. at Columbus, Ohio. There are three of them in use at this plant and a photograph of one has been reproduced here especially to show the feed arrangements. The feed comes down the launder shown at the right and goes into a short launder with high sides to prevent splashing. From this it falls on a coarse screen that keeps any large things that might interfere with the drag from entering. This screen or a screen of the same kind placed somewhere in the feed arrangement should be used with every installation.

The drags formerly made by the Morrow Manufacturing Co. were formerly driven through the pulley at the discharge end and made with direct motor attachment or with belt drives. Last year this company introduced a new type which is shown in Fig. 29. The drive has been changed to the rear pulley, conforming to what is now standard practice.

Single Idler Support

A feature of this design is that a single idler support is used and this is high enough to allow ample room for bringing the feed in below the chains. The overflow is at the rear, and while no method of adjustment is shown, it could be raised somewhat by building up the overflow lip. Legs are provided to support the drain board and front pulley.

The drags of this company are made in three lengths, 12 ft. 6 in., 16 ft. 9 in., and 19 ft. 6 in. The shortest size is made in three widths, 20 in. and 24 in. with a single chain and 30 in. with a double chain. The 16 ft. 9 in. drag has a width of 36 in. and the 19 ft. 6 in. drag a width of 42 in.

The capacities are given at 5, 10, 15, 25 and 40 yd. per hour, and the required power varies from 4½ to 8 hp.

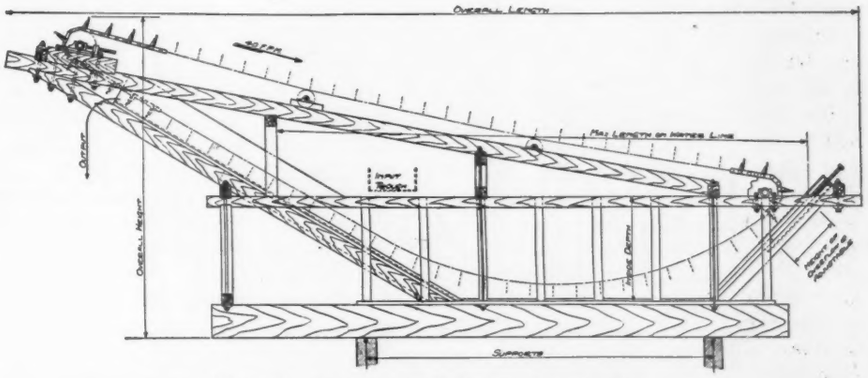


Fig. 28. Another well-designed sand drag

Typical installation of a sand drag in a modern sand and gravel plant

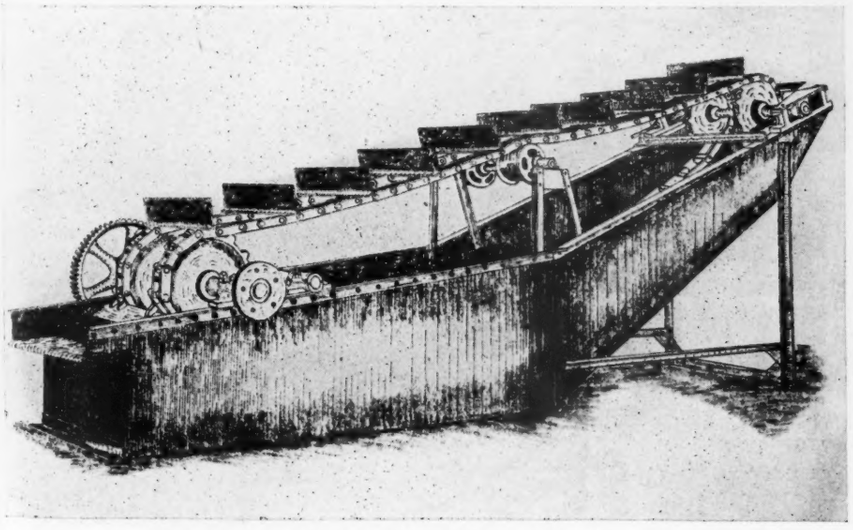


Fig. 29. One of the latest designs for a sand drag

Movable Sand and Gravel Plants With Dredging Operation

Yahola Sand and Gravel Co., Muskogee, Okla., Ships as High as 100 Cars a Day From Unusual Operations

THE YAHOLA SAND AND GRAVEL CO. of Muskogee, Okla., is among the larger producers of washed material in the United States, its shipments running over 100 cars a day in the peak of the season. It takes this big production from deposits of a most unusual character and it screens and washes it in plants that are unique, so far as the present writer's observation goes.

The deposits are in the Grand River, which joins the Arkansas not far from Muskogee, and they are bars of practically pure flint gravel. The very small percentage that could be called sand is sent to waste. The company owns about seven miles of river front adjacent to these bars and works them to depletion.

Some of the bars are of large size. One on which the company was starting work when the notes for this article were made is 4000 ft. long and averages 700 ft. wide. It is estimated to contain more than 2,000,000 tons of gravel. The depth is not great, the dredge working in 10 or 12 ft. of water at a normal stage of the river. Below the bars of gravel is found the river bed of shale.

Material Requires Little Preparation

Except for a little mud and silt brought in by the rises of the river there are no impurities to be washed out, which is one reason why the simple plant to be described serves its purpose so well.

The Grand river rises in the Ozark mountains and is fed from the streams of the Ozark country and these all carry gravels similar to that found in the Grand river. It has been determined that the origin of these gravels is the limestone ledges of the country in which the gravel existed originally as flints. All the gravel found in the Grand river is flint and the well-defined edges show that it has not traveled far. So the theory that these gravels came from the disintegration of the limestone ledges of the Ozark region seems reasonable.

Six Plants Operated Simultaneously

The Yahola company has six plants, but two of them are pumping sand on the Arkansas river. The four on the Grand river resemble one another in construction and operation, except that the newest, built in the winter of 1926 and 1927, has a 12-in. pump, while the others have 10-in. pumps. So the description of one of the operations will serve for all of them.

Whole Plant Moves on Freight Car

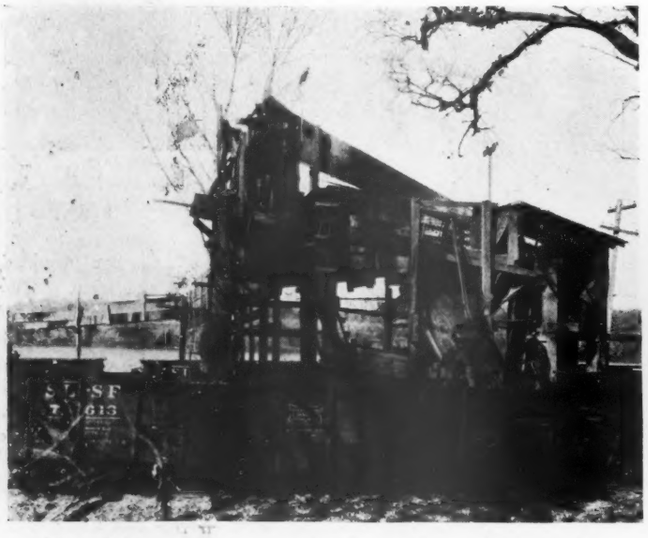
The particular operation to be described is near Fort Gibson, about 13 miles from Muskogee. The bar worked was formerly a long one, well over a thousand feet, but it has been fairly well depleted by the pumping from two dredges. Only one screening plant was being used at the time it was visited, while the other was being packed up to be moved to another situation.

The mobility of these plants is their unusual feature. Walter S. Dills, the president of the Yahola company, told the writer that he had found changing locations to be one of the heavy expenses of production. The fixed type of plant and the semi-moveable type both had this disadvantage of a high cost of moving, so he decided to design a plant that could be placed on an ordinary flat car and moved anywhere up and down the tracks of the company's railroad, which has been laid along the river bank.

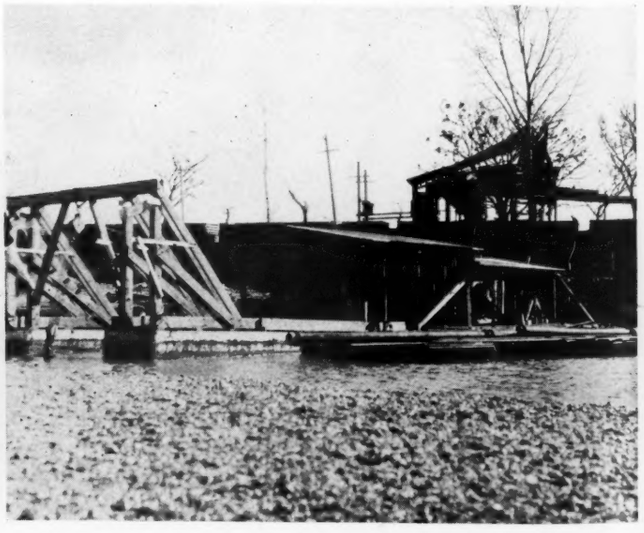
Small as such a plant is, it contains everything essential, grizzly, rotary screen, sand collector (used for pea gravel), crusher for oversize and an elevator to take the crushed discharge to the screen. There is even a small bin to collect the oversize, which amounts to only 10% or 15% of the whole, so that the crusher need not be run until enough oversize has collected to keep it reasonably busy. Of course such a plant is a model of compactness, and the position and size of each piece of equipment had to be fairly carefully chosen in advance.

Dredging Equipment

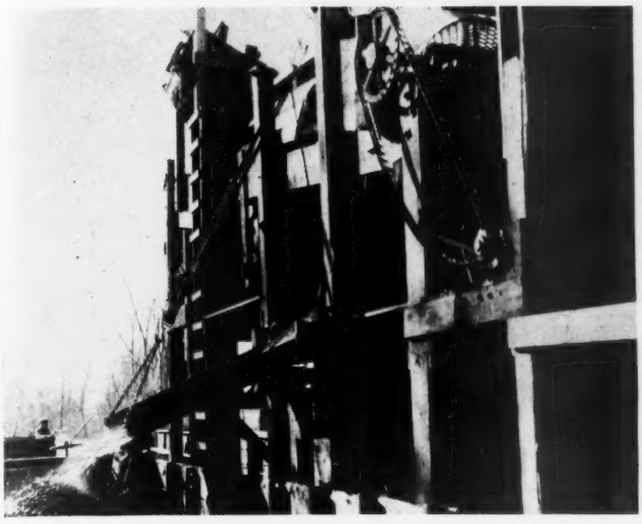
The dredge is of the type that is common to the Middle West, a hull 80x26 ft. drawing about 2 ft. near the center, of which is mounted a 10-in. "Amsco" pump made by the American Manganese Steel Co. This is belt driven by a 150-hp. General-Electric motor of the induction type. The suction of



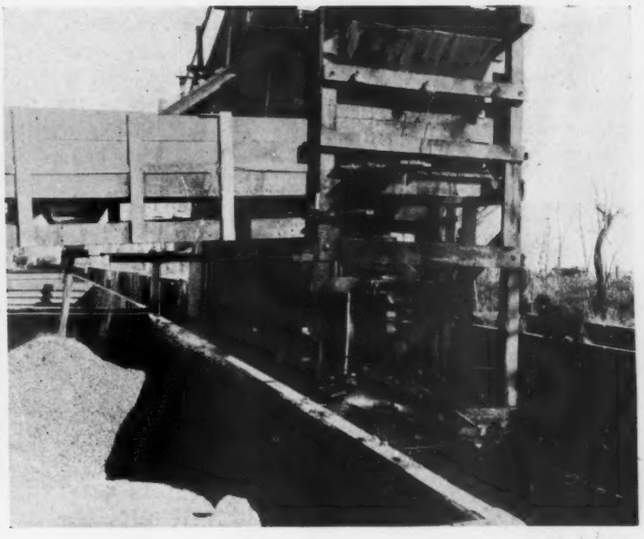
The plant on a flat car as it appears from the land side



The cutter end of the dredge working into the gravel bar



Side view of the Yahola plant showing the chute for pea gravel loading to a railroad car



The man in the car at the right can operator a lever which enables him to control flow of sand to the other car

the pump is protected by a Swintek traveling suction screen, and this is driven by a 25-hp. motor, also of General-Electric make. The discharge line is of welded steel pipe of light weight.

Shore Plant

The discharge is received on a grizzly made of ½-in. bars spaced ½-in. apart. This is quite contrary to the usual practice which is to use a grizzly with wide spaces to take out the oversize for crushing. But, as before mentioned, the deposit contains only a little oversize and that is not of very large pieces, so it is preferable to remove the pea gravel with the grizzly which makes for cleaner screening.

The oversize of the grizzly goes to a revolving screen 48 in. by 18 ft., set lengthwise of the car. It has 2½-in., 1½-in., 1-in. holes and 1½x½-in. slots and a jacket with ¼-in. holes. Hence the plant is equipped to make several sized products, but on the day that it was visited it was making only two products, a mixed gravel for concrete aggregate, all through 2½-in. and remaining on 1½x½-in. slots, and pea gravel from the slot size to ¼-in. These were being loaded into cars on either side of the plant. One of the deficiencies of this moveable type of plant is that it has no bins or other provision for storage. The products have to be run directly to cars and if storage is wanted it must be made for unloading cars at a storage yard away from the washing plant.

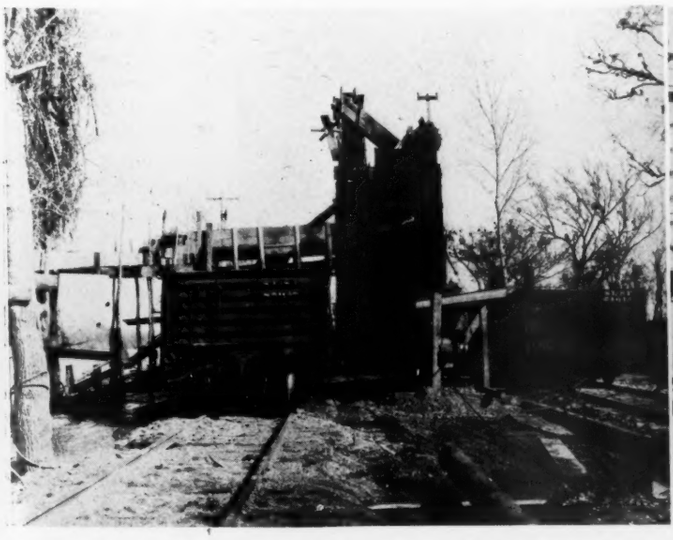
The pea gravel is run to a hopper made of sheet steel which is 4 ft. square at the top and 4 ft. deep. At the bottom is an opening 6 in. square, which is closed by a horizontal sliding gate. This is operated by a system of levers that runs to the car that is being loaded with gravel. Thus the man who has always to be attending to loading the car with coarse gravel can adjust the valve on the pea gravel hopper without leaving his place.

The hopper is necessary as dewaterer, for it will be remembered that the undersize of the grizzly all goes into the pea gravel. The pea gravel taken out by the revolving screen joins it on its way to the hopper.

The overflow of the hopper carries off the clay and fine sand, if there is any, and the discharge from the hopper is dewatered about as well as it would be in any of the automatic forms of sand collectors. With so much coarse material it is somewhat doubtful that any of the automatic forms would work as well, as the valve would probably leak from closing on the larger pieces.

Dewatering the Material

The oversize of the screen falls into a bin with a 45-deg. bottom placed crosswise of the car. A gate at the bottom of this feeds



Showing the end of the Yahola plant with the chute for pea gravel passing off to the left

The car puller set under a shed near the end of the flat car plant

into a 12x18-in jaw crusher made by the Webb City Foundry and Machine Co. It is of a type much used in the Joplin, Mo., zinc fields, where the material to be crushed is flint, the same as this gravel. The discharge of the crusher falls to the boot of a belt and

Showing the size of the pebbles by comparison with the watch

bucket elevator, 16-in. wide, which takes it to the revolving screen.

The crusher and elevator are run by a 20-hp. motor and the screen by a 10-hp. motor, both of General-Electric make. These are housed away from the weather in a little shanty at the end of the car. The entire height of the plant is about 25 ft.

This unusual plant apparently fits the conditions to be met on the Grand river better than any other. This is the experience of Mr. Dills, who conceived it, and it is also the experience of some other companies which dredge this river. They have built this type of plant even where they had other plants of a more conventional type in successful operation. It is possible because of several things, the nature of the material and the market, which does not demand a number of sized products being those of most importance.

The pea gravel was formerly one of the difficulties of working in these plants. There was no market for it and it had to be returned to the river. Mr. Dills experimented with it as a road surfacing and found it excellent for that purpose. Now so much of it is sold that the amount produced with the concrete gravel is not enough to supply the demand.

W. S. Dills

The office of the company is in the Surety Building, Muskogee, Okla. Associated with W. S. Dills are his brother, C. E. Dills, treasurer of the company, and H. A. von Unworth, general superintendent and vice-president. Mr. von Unworth is a graduate of the engineering college of the state university at Lawrence, Kan., and is largely responsible for the design. He was assisted by suggestions from W. H. K. Bennett of Chicago, Ill.

Louisiana Gravel Producers Make Headway in Fight Against Tax

REPRESENTATIVES of gravel interests in the state of Louisiana who went to Baton Rouge seeking lower rates in the gravel and sand schedules of the McClanahan administration severance tax bill have made some headway and indications now point to that agreement. After conferences with Governor Long and some of the members of the senate, where the severance tax bill is pending, following passage by the house, it was announced that Governor Long had agreed to amend the gravel and sand schedules of the bill by reducing the tax on gravel from 2½ cents to 1½ cents per ton and to fix the tax on sand at 1 cent per ton. This concession has satisfied some of the gravel people and it looks as if these interests will accept the schedule and withdraw all opposition.—*Shreveport* (La.) *Times.*

Dredge and sand bar seen from the plant

To Develop Texas Soda and Potash Deposits

THE Nitrates Corp. of America, which has been incorporated at Marfa, Texas, for $500,000, proposes developing a 6000-acre deposit of nitrate of soda and potash in Presidio county. Machinery, including two crushers having a daily capacity of 500 tons, are being installed. A. A. Snell is manager.

Life of Terrazzo Flooring Measured in Tests

MARBLE, slate and limestone are some of the stone materials under test at the Bureau of Standards to determine the uneven wearing qualities of stone flooring, according to a report by D. W. Kessler, Bureau of Standards, outlining the preliminary results of the research, just made public. The full text of the statement follows:

Floors of fine buildings are frequently made the subject of attractive designs by inlaying materials of various color tones. Materials supplying the desired colors are not always of equal resistance to wear and for that reason the floor may wear to a very uneven surface.

Many are familiar with the rugged condition of the floor surface in the Union Station at Washington. Here a very hard red marble has been combined with a much softer white marble. The heavy traffic on many parts of this floor has worn the white marble considerably faster than the red.

Realizing that such cases are due mainly to a dearth of information concerning the wearing qualities of different materials under foot traffic, a line of research has been started at the National Bureau of Standards to develop a means of testing abrasive hardness of various flooring materials. An apparatus has been designed and tests with this are being compared with a series of water measurements on similar materials under service conditions to determine if the test affords a reliable criterion for comparing different flooring materials.—*U. S. Daily.*

Notes on Sand and Gravel Plant Design and Equipment

Part II—Modern Sand and Gravel Plant Layouts Using the Cylindrical Type Washing Screen

By A. L. Munro, Chief Engineer, D. D. Barnes, Sales Manager
Smith Engineering Works, Milwaukee, Wis.

THE second type of plant using the cylindrical washing screen, is shown in Fig. 3. It is somewhat like the plant in Fig. 1 (in the May 12 issue), except that the screen and bin are at right angles to the conveyor and a gyratory crusher is provided to crush the oversize gravel. A hopper, equipped with a plate feeder, discharges the pit-run material evenly to a belt conveyor. This conveyor, instead of discharging directly into the wash box, empties the material on to a heavy type, wedge-bar grizzly, equipped with about 4-in. spaces between the bars. The large stones rejected by the grizzly roll down a chute to a small bin, located over a crusher. The material passing the grizzly drops into the wash box, where a stiff stream of water hits it, washing it down a short flume, soaked and ready for scrubbing in the cylindrical screen.

EDITORS' NOTE

PART I of this article (published in the issue of May 12) outlined the improvements in design of the cylindrical washing screen and described its many advantages in modern methods of sand and gravel washing. It also showed and discussed one simple type of sand and gravel plant layout. The present article shows and describes other types of sand and gravel plants, involving more equipment and larger capacities and discusses the various features of each layout.

The material, after being thoroughly scrubbed and rinsed with clear water, the rinsing being accomplished by a spray pipe extending in the screen from the main pipe line, is separated into sand and various grades of gravel. Sand settling and dewatering is accomplished by an automatic sand-settling tank, located just below the screen deck. Open and simply constructed chutes take the various grades of gravel to their respective bins. The oversize from the screen drops into a chute and discharges into the small bin over the crusher. An adjustable gate on this bin regulates the flow of oversize rock into the gyratory crusher. A small belt conveyor, running directly under

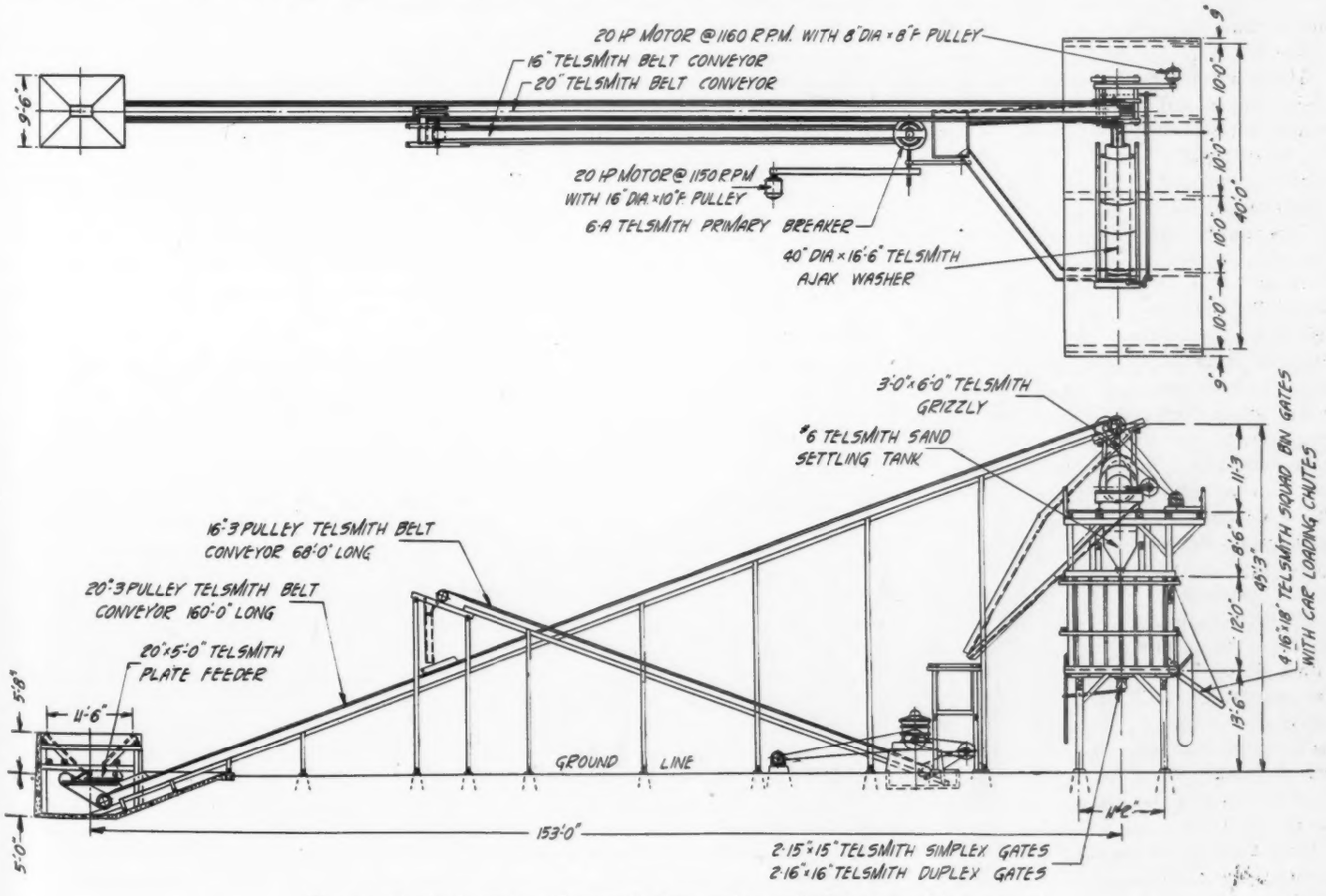

20 HP MOTOR @ 1160 R.P.M. WITH 8"DIA × 8"F. PULLEY
16" TELSMITH BELT CONVEYOR
20" TELSMITH BELT CONVEYOR
20 HP MOTOR @ 1150 R.P.M. WITH 16"DIA × 10"F. PULLEY
6-A TELSMITH PRIMARY BREAKER
40" DIA × 16'-6" TELSMITH AJAX WASHER
3'-0" × 6'-0" TELSMITH GRIZZLY
#6 TELSMITH SAND SETTLING TANK
16"-3 PULLEY TELSMITH BELT CONVEYOR 68'-0" LONG
20"-3 PULLEY TELSMITH BELT CONVEYOR 160'-0" LONG
20" × 5'-0" TELSMITH PLATE FEEDER
4-16"-18" TELSMITH SQUAD BIN GATES WITH CAR LOADING CHUTES
GROUND LINE
153'-0"
2-15" × 15" TELSMITH SIMPLEX GATES
2-16" × 16" TELSMITH DUPLEX GATES

Fig. 3. Typical sand and gravel plant using cylindrical washing screen

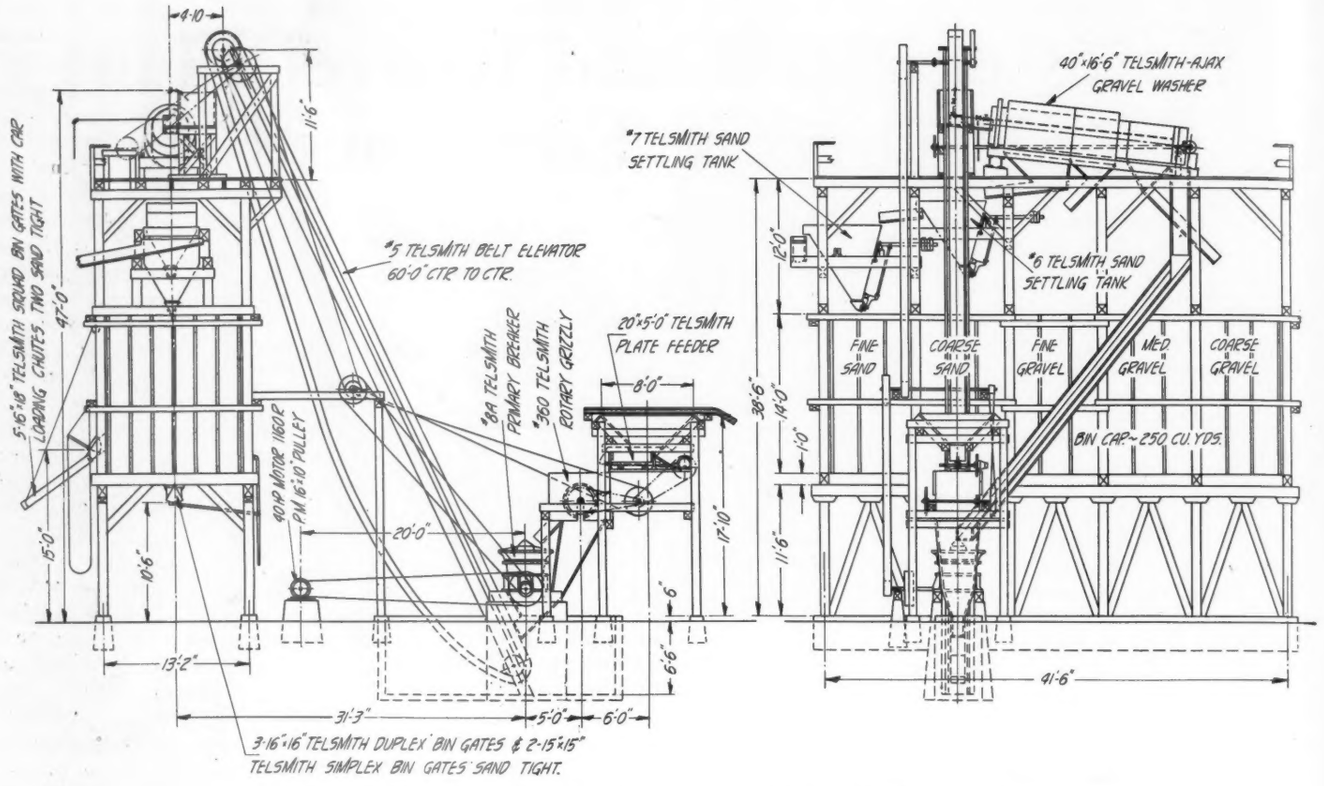


Fig. 4. An example of a sand and gravel plant for restricted ground space

this crusher, carries the crushed stone back to the main plant conveyor, and it again goes through the screen for re-sizing. The main plant bin is equipped with four bottom bin gates and four side bin gates. The sand bin gates should be of sand tight design.

The drives for a plant layout of this type are very simple. The feeder is driven from the foot shaft of the long belt conveyor. This feeder is usually equipped with a clutch, so that the flow of material from the hopper to the belt can be quickly shut off. One electric motor, located on top of the bins, drives the long main conveyor and cylindrical washing screen. Another motor, located on the ground, drives the crusher; and the short return conveyor, for the crushed material, is driven from the crusher countershaft. In addition to these two motors, a centrifugal water pump with motor and an excavating unit to supply the plant receiving hopper with material, are required to complete the mechanical equipment for the plant.

The bins are so designed that trucks can be loaded underneath from the bottom gates; and trucks or railroad cars can be loaded from the outside by the side-bin gates shown. If desired, side gates may also be installed on the inside for loading trucks. Due to the use of the cylindrical type of screen, the bin construction is of the simplest type. The top of the bin is horizontal, as is the screen deck, allowing as much sand bin capacity as of the other sizes of gravel.

This type of plant, due to its simplicity of construction and operation, is highly recommended for the small or medium sized sand and gravel operation. For a capacity of 500 cu. yd. per 10-hour day, with a fair percentage of oversize material to crush, this makes an unusually efficient plant. After the material enters the receiving hopper, the operation from there on is practically automatic and a minimum amount of labor is required. Only 40-hp. is required for the plant as shown, so that power requirements are very reasonable and plant up-keep expense is low.

A Plant without Conveyors

If the shape of the pit or the plant location does not permit using conveyors, as shown in Fig. 3, and a close coupled plant is necessary, the next best bet is a layout like Fig. 4. This plant is laid out for a drag scraper as the excavating unit. However, if it is desired to use other methods for excavating, the receiving hopper can be put down on the ground, as in Fig. 3, and a short belt conveyor installed to elevate the material to the rotary grizzly. While Fig. 3 provides for making only one size of sand, Fig. 4 shows how, by adding another sand-settling tank, an additional grade of finer sand can be produced. As in the previous layouts, the use of a cylindrical washing screen allows plain, economical bin construction, open and easily constructed chutes and simple drives. One 40-hp. motor, located on the ground, drives the whole plant except the pump and excavating unit, which are not shown in the drawing.

Following the latent trend in sand and gravel plant practice, the elevator used in Fig. 4 should be equipped with a steel frame. Until recently, gravel operators were content with wood frame elevators and screens; but the wet conditions encountered around a sand and gravel plant require a more substantial equipment, which will not warp and rot. Modern practice equips both elevators and washing screens with steel supports to overcome these objections.

Following the same line of reasoning, many of the more progressive operators are using steel bins instead of wood, or sometimes a combination of steel and wood. The plants shown in Figs. 1, 3 and 4 can be readily designed with steel bins and supports, making the whole plant a very substantial and permanent outfit.

Again referring to Fig. 4 and other plants where elevators are used, it has been found that operators generally prefer the belt type instead of the chain elevator. The abrasive character of sand makes this choice fairly obvious.

Both the plants shown in Figs. 3 and 4 use grizzlies for making the preliminary oversize separation. These work out well where accurate classification and fine separations are not required. In Fig. 3 the grizzly is the sloping stationary type with wedge-shaped bars. In grizzlies of this type, the bars should be installed fan-shaped in the steel frame; that is, with slightly larger spaces between the lower ends of the bars than between the upper ends. This prevents wedging of the stone between the bars and helps immensely to keep the grizzly

clean without constant supervision. In the rotary type, shown in Fig. 4, automatic, tripper teeth keep the openings clear. The mechanical grizzly assures more accurate classification and greater capacity.

In the last two plants described, oversize gravel from the wet screens is chuted to the crusher. This aggregate sometimes carries considerable moisture along with it; and if there were no dry material mixed with the wet rejections, this would be a questionable feature. However, in both these plants, the dry material from the grizzly so reduces the percentage of moisture in the whole crusher feed, that the difficulty is avoided. Sometimes, when digging under water, it is impossible to avoid the difficulty of crushing wet rock. In such cases, it is advisable to use perforated chutes and drainage bins to eliminate water from the crusher feed.

Crusher Details

In large plants, handling 500 cu. yd. or more per day, where the percentage of oversize gravel is great, the best practice requires a preliminary screen or scalper in closed circuit with the crusher or crushers. This makes the crushing operation a dry process and eliminates the troubles incident to crushing wet material. The scalper has another important advantage—a big reduction in the circulating load, with consequent economy of wear and power and improved classification. Under present competitive conditions, even a small saving in power and upkeep expense is worth serious consideration.

In some localities, the demand is largely for material under 1½ in. or 2 in. This makes it necessary to provide more than the average crushing capacity. This feature can better be taken care of with a plant using the preliminary or scalping screen.

Fig. 5 shows a plant with an output of 1000 cu. yd. per 10-hour day, including ample crusher capacity. A receiving hopper is provided to take the feed from drag scraper or cars. A plate feeder discharges material evenly from this hopper to a 30-in. belt conveyor, which elevates it to a 48-in. x 14-ft. scalping screen. The first section of this scalper is perforated to pass the largest commercial size to be produced. Material passing these holes goes directly to the main plant conveyor and to the cylindrical washing screen for washing, rinsing and sizing. The last 4 ft. of the scalping screen are perforated with 4-in. holes. Gravel passing these holes is chuted to a gyratory reduction crusher, which is capable of producing minus 1-in. material. All gravel larger than 4 in. is rejected to the gyratory breaker. Both crushers discharge to an 18-in. belt conveyor, which returns the crushed material back through the scalping screen, making a closed circuit and preventing any oversize rock going to the washing screen.

In addition to the advantages already stated, the use of the scalping screen relieves the washing screen. It can be readily seen that the first section of the scalper determines the largest size product that the plant can make, so that the last section of the washing screen may be punched for the next smaller size of product.

Advantages of the Cylindrical Screen

Here again, in a plant of this type, the cylindrical washing screen offers another decided advantage. The scalping screen and the washing screen are the same diameter. If desired, they can be constructed exactly alike, except as to length; and of course the scalper will have no scrubbing section. This means that screen repair parts, such as trunnions, rollers, roller rings, gears, bearings, etc., will be interchangeable, making the question of repairs a more simple one.

The cylindrical washing screen in this plant makes three sizes of scrubbed, washed and rinsed gravel and two grades of sand. Bin construction is of the simple box type and equipped with bottom and side bin gates for discharge into trucks and railroad cars. Five bottom and five side gates are provided. All of the sand bin gates should be provided with sand tight linings.

One 30-hp. motor, located near the scalping screen, drives the feeder, the 30-in. conveyor and the scalping screen. Each of the crushers has a separate motor—one 25-hp. for driving the reduction crusher and one 25-hp. for driving the breaker and return conveyor. Another 30-hp. motor, located on the washing-screen deck, drives the long conveyor and washing screen. The automatic tanks require no power. There are four motors in all, totaling 110 hp., to drive the complete plant as shown. Additional power units will, of course, be necessary for driving the water pump and excavating unit.

The two long conveyors in this plant are equipped with gravity type belt take-ups. These are the most efficient and economical devices for taking care of belt stretch and slack and are recommended for large or long conveyors. Belt conveyors, used in layouts of this kind, are usually inclined from 18 deg. to 22 deg. Some operators prefer an elevator to return the crushed gravel from the crushers to the scalping screen, instead of the conveyor; and this feature can be

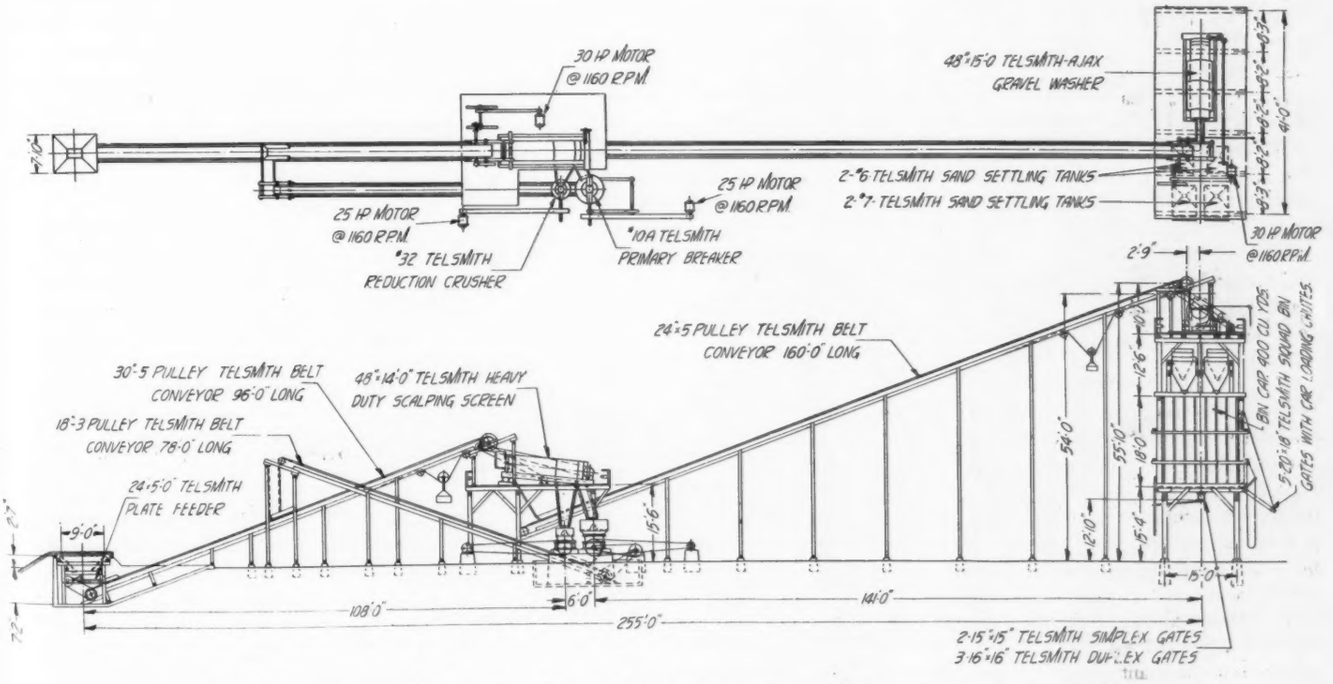

30 HP MOTOR @ 1160 R.P.M.
48"x15'-0 TELSMITH-AJAX GRAVEL WASHER
2-"6 TELSMITH SAND SETTLING TANKS
2-"7- TELSMITH SAND SETTLING TANKS
25 HP MOTOR @ 1160 R.P.M.
25 HP MOTOR @ 1160 R.P.M.
"10A TELSMITH PRIMARY BREAKER
"32 TELSMITH REDUCTION CRUSHER
30 HP MOTOR @ 1160 R.P.M.
24"x5 PULLEY TELSMITH BELT CONVEYOR 160'-0" LONG
30"-5 PULLEY TELSMITH BELT CONVEYOR 96'-0" LONG
48"x14'-0" TELSMITH HEAVY DUTY SCALPING SCREEN
18"-3 PULLEY TELSMITH BELT CONVEYOR 78'-0" LONG
24"x5'-0" TELSMITH PLATE FEEDER
BIN CAP 400 CU YDS
5-20'x18' TELSMITH SQUARE BIN GATES WITH CAR LOADING CHUTES
108'-0"
6'-0"
141'-0"
255'-0"
2-15"x15" TELSMITH SIMPLEX GATES
3-16"x16" TELSMITH DUPLEX GATES

Fig. 5. A recommended sand and gravel plant design for medium or large sized operation

substituted if desired. However, it is much easier to avoid spillage with belt conveyors, so that the layout as shown makes the least troublesome and most economical installation in the long run.

If the shape of the pit or the proposed plant location does not permit building the plant in one long straight line as shown, it is a simple matter to change this layout so that the first conveyor and scalping screen will be at right-angles to the main 24-in. plant conveyor. The main 24-in. plant conveyor can also be installed on a straight line with the washing screen and bins; and then the first conveyor, hopper and scalper at right angles to it, in either direction. The whole layout is quite flexible and, with few minor changes, can be made to fit almost any operation.

All things considered, Fig. 5 is an exceedingly efficient and economical layout and is highly recommended for the ordinary medium or large sized plant. The scalping screen and two crushers allow a great deal of variation in the sizes that can be produced. All of the machinery is of steel-frame construction; and in this, as in the previous plants, steel construction can also be employed for the bins, conveyor runways and supports, making a strictly modern plant in every way. Operators in some sections of the country seem to prefer the round reinforced-concrete bins. These make a very substantial and long life structure. If desired, this type bin can be readily substituted in any of the previous layouts to replace the wood or steel. When round concrete bins are used, they can all be of the same diameter and same height. The same forms can be used for building all of the separate bins. This uniformity of bins and the resulting economy in constructing them is made possible by the use of the cylindrical washing screen.

The next part of our article will include plant layouts where the crushed material is kept separate from the ordinary gravel, plants using cableway excavators for digging the material and pumping or dredging propositions.

(To be continued)

Increased Use of Magnesium Alloys May Lead to New Developments in Dolomite

A RECENT article in *Industrial and Engineering Chemistry* calls attention to the recent advances made in production and cost of magnesium which have made it an important engineering metal. The advantages of magnesium alloys have long been known, but the high price of the metal has prohibited its extensive use.

All European magnesium and the greater portion of that now being produced in this country is made by the chloride process. The development of a low-cost raw material together with modifications of European practice has made the chloride process an economic success. Dehydrated magnesium chloride is now commercially available. This has substituted continuous operation of the electrolytic cells for the batch process required when using mixtures of $MgCl_2$ with NaCl or KCl. Still further advance was made when it became possible to use a partially dehydrated magnesium chloride.

The importance of this to the dolomite industry lies in the high magnesium oxide content of that mineral. A cheap process for converting the magnesia in dolomite to magnesium chloride might lead to the utilization of dolomite as a raw material for the production of magnesium.

A Plaster Manufacturer's Chinese Business Card

A LONG-TIME friend and subscriber of Rock Products sends us one of his business cards, which is reproduced herewith—both sides. Both say the same thing. We thought gypsum manufacturers might like to see what their product looks like in Chinese—a $5 reward to any American gypsum man who can pick out the Chinese equivalent of the word *gypsum!*

THE SIMPLEX PLASTER CO., LTD
MANUFACTURERS OF GYPSUM PRODUCTS

HERBERT A. STOUT
PLANT MANAGER

POWELL S BUILDING
HONG KONG

香港寶路行
白士敏有限公司
石羔製造品
廠長夏拔士斗

Two sides of a gypsum manufacturer's business card

Geological Survey Bulletins of New Zealand

BULLETINS Nos. 31 and 32 of the New Zealand Geological Survey, issued by the Department of Scientific and Industrial Research of New Zealand, are a part of the new series of the survey.

Bulletin No. 31 "The Geology of the Tongahorutu-Ohura Subdivision," by L. I. Grange, deals with the civilization, climate, industries, physiography, general geology and economic geology of the district. The bulletin contains numerous photographs and several colored geological maps showing the periods of the various districts of the division and the various formations.

Bulletin No. 32, "Minerals and Mineral Substances of New Zealand," by P. G. Morgan, contains an alphabetical list of approximately 500 mineral substances found in New Zealand, giving their classification, characteristics, locations, modes of origin, associations and economic uses. An economic map, showing the geographical distribution of the more important minerals, and a bibliography are included in the report.

An Unusual Rock Product

LOCATED in the southwest part of Tippah county, Miss., near Ripley, is something new in the way of a factory. G. W. Strickland, of the lumber firm of Strickland and Hazard, has installed a razor hone factory, making them out of a valuable rock found in that part of the county.

The quality of the rock was discovered by Isom Carter, a Ripley barber, who is using one of the hones in a hotel barber shop at Jackson, Tenn. Barbers in this county have been using them for some time.

Dr. Henry Mace Payne, of Washington, mining authority, says it is of excellent quality and that there is only one other source of supply of this rock known.—*Birmingham* (Ala.) *News.*

Modern Sand Lime Brick Plant

Atlas White Brick Co.'s Factory at Berlin, N. J., Shows Development of the Industry

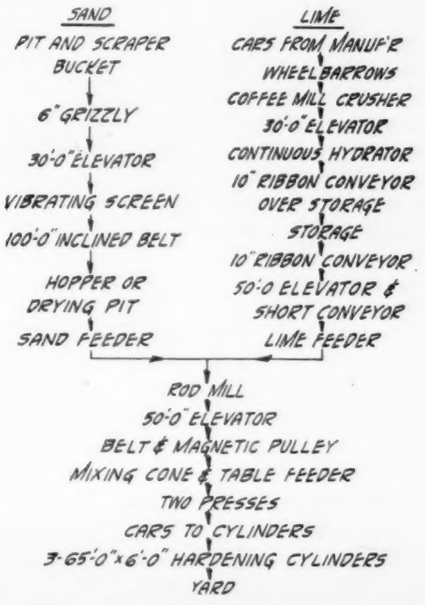
THE ATLAS WHITE BRICK CO., which has its main office at Atlantic City, N. J., has recently built a plant about two miles from Berlin, N. J. The company has been engaged in the manufacture of sand lime brick for some years and was able to put up the buildings of the new plant from its own product. Some of the machinery was moved from the old to the new location, but most of the essential machinery is new and practically all of it was supplied by Jackson and Church, Saginaw, Mich.

This includes even the equipment at the sand pit, a scraper bucket of the arrowhead type and a simple double-drum hoist with a 20-hp. Westinghouse motor. The pit is in the silica sand, which is found rather abundantly in southern New Jersey, although it is finer than the sand dug for glass making. An average sample is of such fineness that all of it will pass 40-mesh, 60% will remain on 80-mesh and 80% will remain on 100-mesh. Both the fineness and the uniformity of grain size render it very desirable for making sand-lime brick.

The scraper bucket discharges on a grizzly made of pipes set 6 in. apart, intended to keep out roots and the like, as there are no coarse pieces in the deposit. The sand runs from a hopper below the grizzly to the boot of a 30-ft. elevator that lifts it to a Link-Belt vibrating screen driven by a 3-hp. motor. The oversize, consisting of trash and an occasional stone, goes to waste. The undersize goes to a 100-ft. inclined conveyor belt to a sand hopper set in the roof trusses of the building.

In wet weather, or when the hopper is full, the discharge of the inclined belt may be sent through a chute to a conveyor that distributes it into a drying pit on the floor below. This pit has steam pipes on the sides and the heat from these pipes and the drying the sand gets from handling are enough to dry the sand so that it will work in the sand feeder. The sand from the pits is reclaimed by wheelbarrows which are dumped into the foot of a 50-ft. elevator that lifts it into the feed hopper.

This hopper is about 14 ft. square. At its apex is placed a Jackson and Church automatic feeder, a short belt run through a link and rachet and pawl. By varying the throw of the pawl the speed may be closely regulated. The sand on the belt passes under rollers that are attached to switches. A set of rollers sounds an alarm when the hopper is empty by moving a switch and a somewhat similar arrangement shuts off the feed when the rod mill below is not running. A similar hopper and feeder is used for lime.

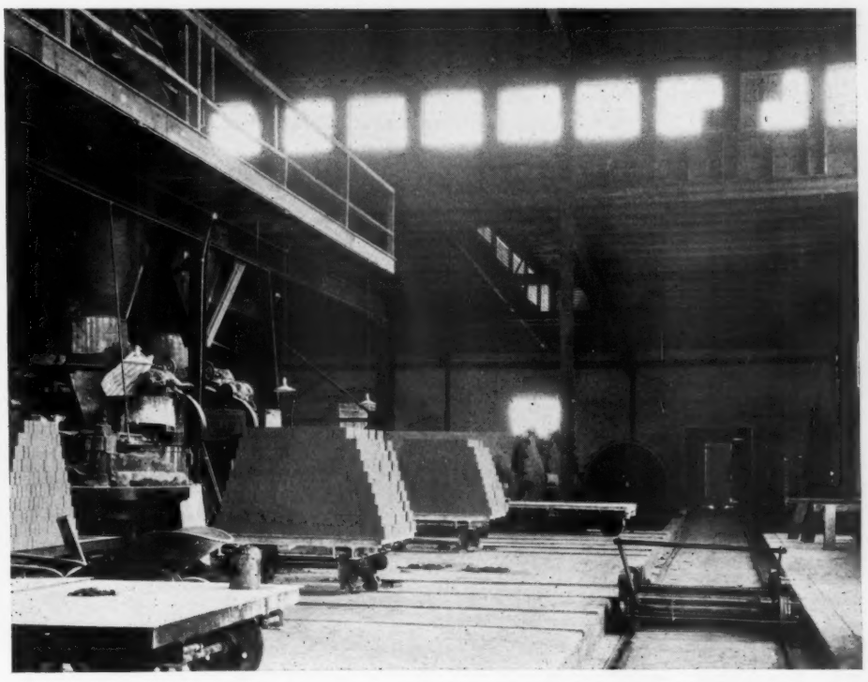


Flow sheet which gives courses of sand and lime

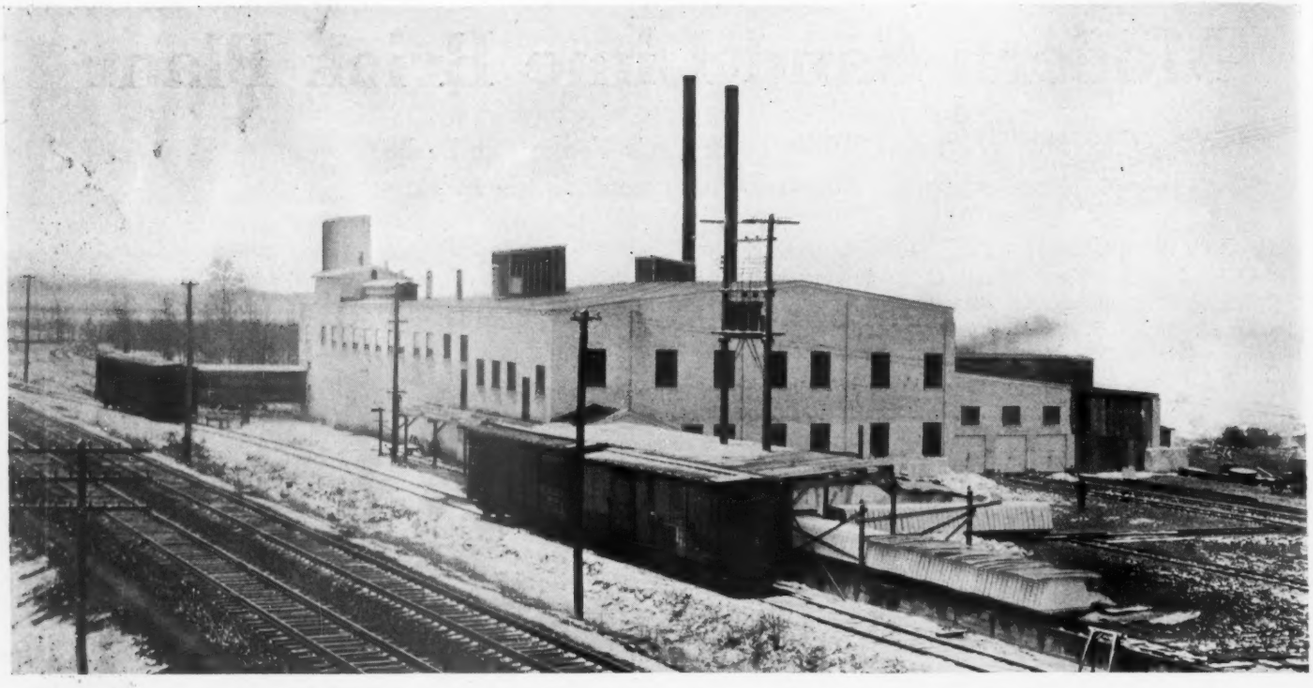
Lime, the other component of the mix, is brought in by rail from the plant of the American Lime and Stone Co., Bellefonte, Penn. It is the product of rotary kilns and known as "pebble lime," and it is constantly analyzed by the makers to be sure that it is of suitable quality for the manufacture of sand lime brick. The superintendent of the plant said that, in his opinion, one of the essentials of success in making sand-lime brick was a uniform quality of lime, and he thought it well to buy from only one company that could guarantee uniformity as well as the necessary high calcium content.

Railroad cars are unloaded by wheelbarrows which are dumped into the mouth of a Jackson and Church crusher of the "coffee mill" type, which crushes the lime sufficiently fine for hydrating. The hydrator is on a floor above the crusher and the crushed lime is lifted to it by a 30-ft. elevator.

The hydrator is of the continuous type, a double screw working in a covered trough with spray pipes to supply the water and feed through a sector feeder. Hydration for sand-lime brick making does not need to be surrounded with the safeguards that are needed where chemical and mason's hydrate are made, and the hydrator may be of a simple type, as this is. The discharge of hydrated lime falls on a 10-in. ribbon conveyor about 75 ft. long, running in a trough provided with gates over the five lime storages. These are tall bins of sand-lime brick opening on the floor below.



Interior of the main building; presses in front and hardening cylinders in rear



The main building is constructed of the company's own brick made at an older plant

Lime storage bins and lime conveyor

The hydrator and the ribbon conveyor are driven by one 20-hp. Westinghouse motor.

The hydrated lime is hoed or otherwise drawn out by hand from the bins to another 10-in. ribbon conveyor running in front of the doors. This takes it to a 50-ft. elevator and a short conveyor belt that discharges the lime into the lime feeder hopper. The lime feeder hopper is set opposite to the sand feeder so that the discharges of both feeders fall together into the rod mill.

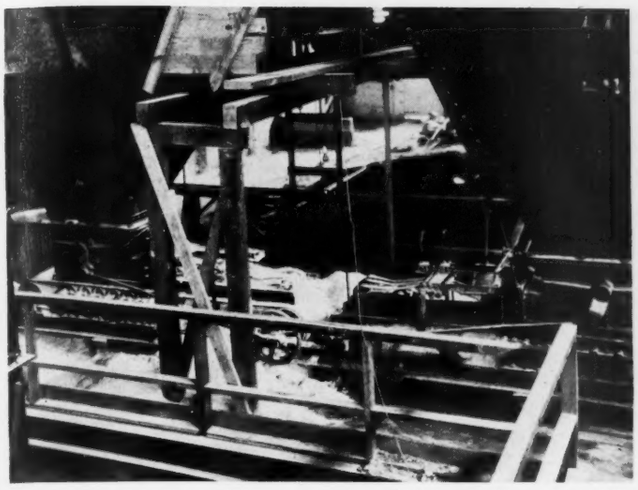
The mill is 11x4 ft. and is driven by a 50-hp. Allis-Chalmers motor through a six-strand Allis-Chalmers "tex-rope" drive. It discharges directly into the boot of a 50-ft. elevator which lifts it to a short conveyor above which is a Dings magnetic pulley and separator. A surprising amount of tramp iron is picked up by this separator, mostly nails, but there are occasionally larger pieces that might damage the presses as well as injure the product.

This short belt discharges into a split chute or "pants legs," which feeds into the two cones above the presses. These cones are over a table feeder. The shaft of the feeder passes to the floor above, where it is driven by a small motor and a "tex-rope" drive. These motors and some of the others of Westinghouse make are of the dustproof type, enclosed in metal casings.

The presses are of the standard Jackson and Church type, each with a capacity for 20,000 brick per day. Two new ones were in operation when the plant was visited and a third, which had been moved from the old plant, was being installed. The brick are taken from the presses by two offbearers to each press and piled on special cars to be wheeled to the kilns. The tracks are laid in the concrete floor and ball bearing turntables of a very neat design make it easy to transfer from one track to another.

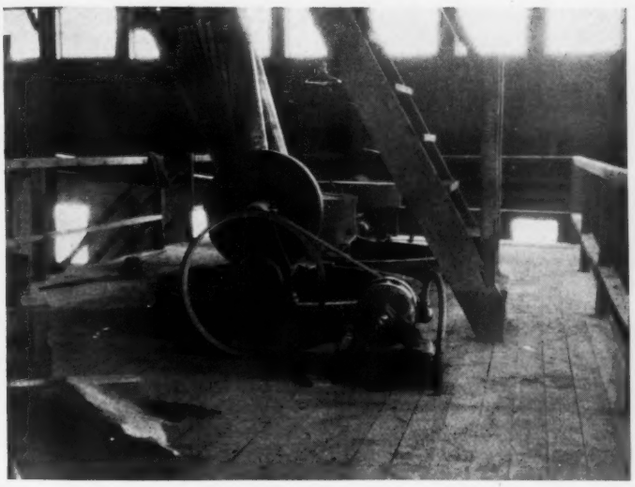
The hardening cylinders into which the cars are run are also of Jackson and Church make and they are 65 ft. long and 6 ft. in diameter. Steam is supplied to them by

The dragline bucket used to dig the sand from a deposit near the plant

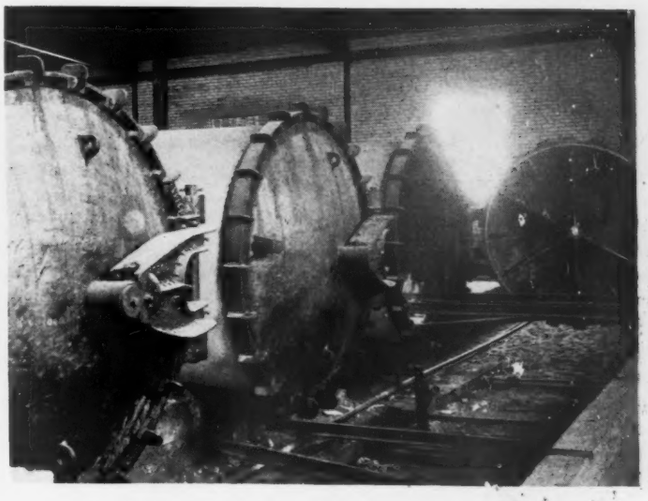


Lime and sand feeders over mill which are fitted with alarms to warn when the hopper above the feeder is low

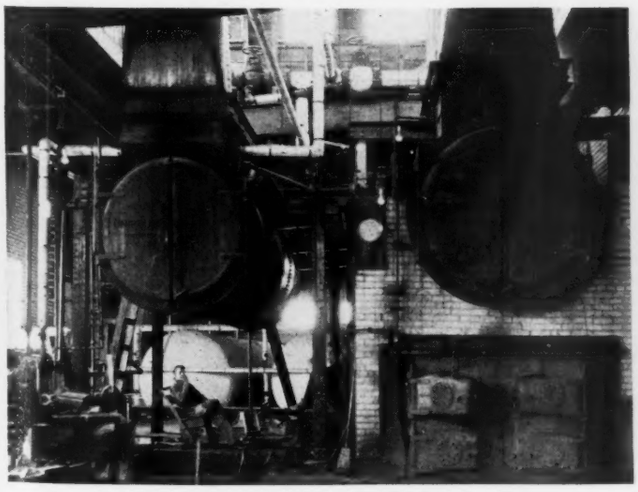
The rod mill in which the hydrated lime and sand are ground together at the right consistency for pressing



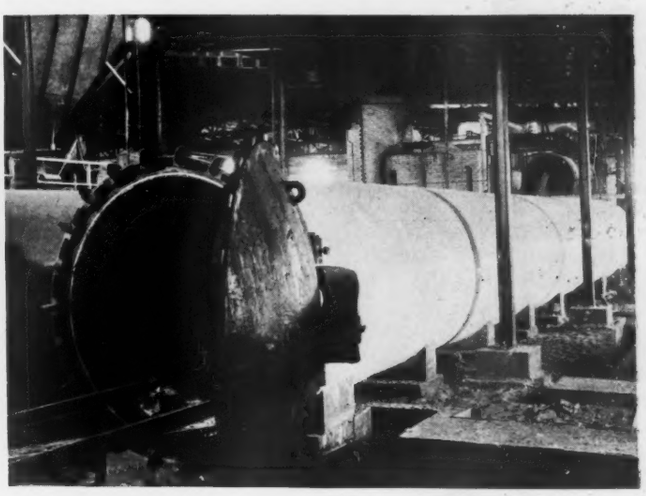
Split chute from elevator and drive of agitators and feeders above brick presses



Heads of the hardening cylinders, each of which holds 20,000 brick. Others are being installed



The boilers which furnish steam for hardening. One was being bricked in when photograph was taken



One of the hardening cylinders. All cylinders and pipes were insulated by a concern that specializes on such work

two Lebanon boilers of 150-hp. Each cylinder is provided with an "American" pressure gage that normally registers 125 lb. The minimum hardening time is 12 hr. and each cylinder will hold 20,000 brick.

After the brick have been hardened they are wheeled into the yard where the same system of tracks and turntables provides for easy distribution of the product. A part of the storage space is under a shed and brick are loaded into cars from this space in wet weather.

The product of this plant is excellent, passing all the tests for strength in compression and flexure and the absorption tests with a high margin. The appearance is also excellent, the color being very uniform, as shown by the bricks piled in the yard, and all the edges clean and sharp. The main building, 152x114 ft., with a 15-ft. bay on one side, is an excellent advertisement for the product of the plant. The reputation of the product is by no means confined to the New York and Philadelphia markets, which are the nearest. Some good sized orders have been filled from New England and points equally distant.

Storage yard at end of plant

The main office is at 211½ Commerce street, Atlantic City, N. J. Thomas Gresham is president of the company.

The plant superintendent is Herman Schmeck.

All the engineering work connected with building the new plant was done by the engineering department of Jackson and Church. The electrical machinery is of Westinghouse make except as otherwise stated.

Government Specifications Index

AN alphabetical index and numerical list of United States government master specifications, compiled by the federal specifications board, complete to January 1, 1928, is now available. Copies can be obtained from the Superintendent of Documents, Government Printing Office, at Washington. Gypsum products, lime, portland cement and kindred products are listed in the index.

"True" Specific Gravity of Feldspars

TECHNICAL NEWS BULLETIN No. 129 (January, 1928), of the U. S. Bureau of Standards, contained a report of the study of the thermal expansion of the 19 commercial feldspars under investigation. The following report summarizes the study of the true specific gravity of the raw, partially fused, and fused feldspars. A Hubbard type pycnometer, closed with a polished glass disk to seal the capillary and prevent evaporation, was used in this study. Samples weighing approximately 5 grams were used. The weighings were made on a chemical balance sensitive to the fourth decimal. The pycnometer was dried at 110 deg. C., the sample introduced, weighed and evacuated under a bell jar. Freshly boiled distilled water sufficient to cover the sample was then added through a separatory funnel. Then the pycnometer was removed, more water added, the sample allowed to settle, and cooled to 20 deg. C. ± 0.1 deg. in a constant temperature water bath. After the sample had settled and cooled the pycnometer was completely filled with water, wiped dry with a soft, clean cloth, and weighed.

The results shown in the following table indicate that the average values for the raw feldspars vary from 2.615 for sample No. 1 (high soda feldspar) to 2.574 for sample No. 19 (high potash feldspar). These values compare favorably with those found by other investigators. Since there is a difference of only 2% between the greatest and least specific gravities of the 19 feldspars, covering the field from albite to microcline, it is doubtful whether the determination of specific gravity will have any value as a practical test to determine the type of feldspar purchased.

True specific gravities of feldspars in terms of equal volues of water at 20 deg. C.

Feldspar No.	Raw feldspar	Fired to Cone 4	Cone 8	Cone 10	Cone 12	Cone 13	Cone 14
1	2.615	2.513	2.424	2.374	.....	.....	.....
2	2.613	2.517	2.422	2.407	.....	.....	.....
3	2.612	2.461	2.422	2.389	.....	.....	.....
4	2.614	.....	2.428	2.420	.....	2.413	.....
5	2.604	.....	2.412	2.407	.....	2.386	.....
6	2.602	.....	2.454	2.422	.....	2.393	.....
7	2.610	.....	2.444	2.403	.....	2.395	.....
8	2.595	.....	2.404	2.397	.....	2.388	.....
9	2.593	.....	2.411	2.394	.....	2.384	.....
10	2.598	.....	2.412	2.402	.....	2.400	.....
11	2.600	.....	2.406	2.397	.....	2.394	.....
12	2.598	.....	2.403	2.408	.....	2.377	.....
13	2.589	.....	2.426	2.411	2.410	.....	2.376
14	2.594	.....	2.435	2.414	2.396	.....	2.372
15	2.582	.....	2.430	2.401	2.387	.....	2.370
16	2.586	.....	.....	2.412	2.406	.....	2.374
17	2.572	.....	.....	2.409	2.400	.....	2.377
18	2.583	.....	.....	2.381	2.379	.....	2.376
19	2.574	.....	.....	2.397	2.375	.....	2.376

For the determinations of the true specific gravity of the partially-fused and fused feldspars the samples were pressed in mullite crucibles fired to cones 4, 8, 10, 12, 13, and 14, drawn at the desired temperature, and quenched in running water. The specimens were broken away from the crucibles, crushed between hardened steel surfaces, ground in an agate mortar, magnetic particles removed, passed through a No. 100 sieve, and the specific gravity determined.

The results show that the specific gravity of the feldspar decreases when fired to cone 4 and drops still more when fired to cone 8. When fired to cones 10, 12, 13, and 14 only slight differences are shown, indicating that the crystalline form has been nearly all converted to amorphous glass. The definite molecular structure of the feldspar crystal is evidently converted to leucite and glass on melting, as has been reported by Morrey and Bowen,* and the glass resulting from undercooling shows a drop in specific gravity and an increase in volume. The average increase in volume for a feldspar fired to cone 4 is 4%, fired to cone 8 is 7%, and fired to cone 10 is 9%. This conforms to data obtained by other investigations.—*Technical Bulletin* of the U. S. Bureau of Standards.

Mica in 1927

THE total quantity of uncut mica sold by producers in the United States in 1927, as reported by the United States Bureau of Mines, Department of Commerce, was 7036 short tons, valued at $322,621. Of this quantity 756 tons (1,512,492 lb.), valued at $212,482, was sheet mica; the rest was scrap mica.

The production was made by 11 states, North Carolina, New Hampshire, South Dakota, New Mexico, Virginia, Connecticut, Colorado, Maine, Georgia, Alabama and Nevada.

DOMESTIC UNCUT MICA SOLD BY PRODUCERS IN THE UNITED STATES IN 1926 AND 1927

	Sheet Mica Pounds	Sheet Mica Value	Scrap Mica Sht. tons	Scrap Mica Value
North Carolina				
1926	700,313	$150,362	2,880	$54,048
1927	665,360	114,514	2,995	50,505
New Hampshire				
1926	1,371,890	235,890	1,738	38,213
1927	720,219	78,849	1,284	22,909
Other states†				
1926	53,852	8,108	1,437	27,699
1927	126,913	19,119	2,001	36,725

†Alabama, Colorado, Connecticut, Georgia, Maine, Nevada, New Mexico, South Carolina, South Dakota and Virginia.

The total sales of uncut sheet mica in 1927 showed a decrease of 30% in quantity and 47% in value, as compared with 1926. The total scrap mica sold showed a decrease of 11% in quantity and 19% in value, as compared with 1926.

The sales of uncut sheet mica in North Carolina showed a decrease of 5% in quantity and 24% in value. New Hampshire showed corresponding decreases of 48% in quantity and 67% in value.

The average value per pound of all sheet mica sold in the United States in 1927 was about 14 cents, as compared with 18 cents in 1926, and the average value of scrap mica a short ton was about $18 in 1927, as compared with $19 a ton in 1926.

* "The Melting of Potash Feldspar," by G. W. Morrey and W. L. Bowen, Am. J. of Sci., Vol. IV, July, 1922.

Union Limestone Company Markets Former Waste Material

Hillsville, Penn., Quarry Operation Now Washes and Markets Screenings

By A. K. West
Canton, Ohio

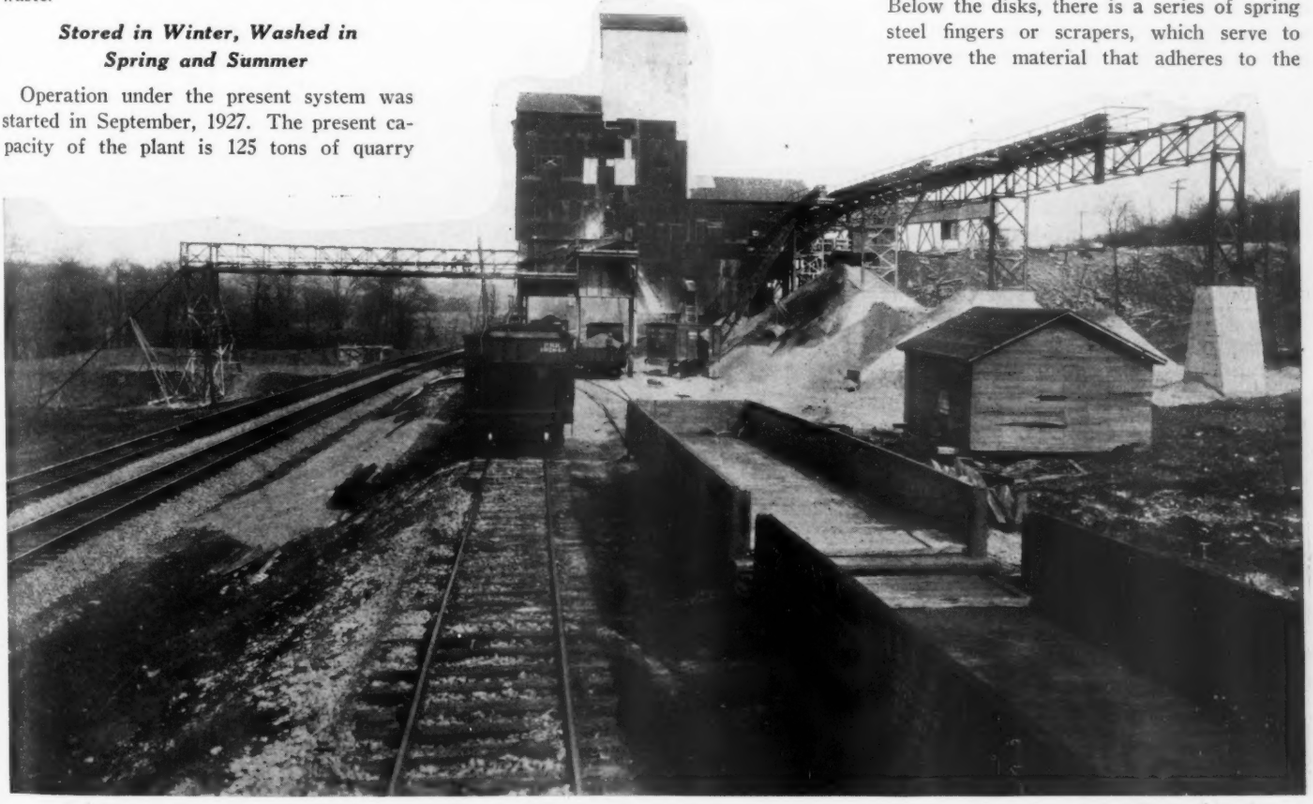
RECENTLY the Union Limestone Co., of Youngstown, Ohio, converted its plant at Hillsville, Penn., into a washing plant. As a result of the change, over 30% of its quarry product, which was formerly waste, is now a marketable product. The factors that brought about the conversion of the plant are substantially as follows: The limestone as received from the quarry is pretty well mixed with clay and formerly all screenings under 1¼ in. were considered waste and were dumped in a waste pile. The existence of a waste pile aggregating between 400,000 and 500,000 tons of material coupled with the growing demand for clean crushed stone of the smaller sizes gave rise to a determination on the part of the company to install equipment for reclaiming the waste by washing. In addition the new plant permits the utilization of all the stone coming from the quarry, none of it going to waste.

Stored in Winter, Washed in Spring and Summer

Operation under the present system was started in September, 1927. The present capacity of the plant is 125 tons of quarry material per hour, of which, after crushing, about 40 tons is minus 1¼-in. The capacity of the washing plant for handling the latter material amounts to 75 tons per hour. The overall capacity of the plant is, however, subject to seasonal variations. In winter, because of climatic conditions, it is impractical to wash the undersize material, which consequently is diverted to the reclaiming storage pile, formerly the waste pile. Fig. 1 shows part of the reclaiming storage pile, and the two conveyors that serve it. The lower carries material to the elevator boot. In the periods of milder weather, all the material received from the quarry is washed and delivered either to loading bins or to ground storage pockets for shipment. In addition, a certain amount of material from the reclaiming storage pile is mixed with that coming from the crusher. These conditions had considerable influence on the equipment and on the routing of material through the plant, as can be gathered from the following description.

Winter-Operating Scheme

Since the winter operation is the simpler, it will be described first. The raw material from the quarry is delivered by cars to a car dumper directly above the crusher hopper. From the crusher, which is of the Austin gyratory type, belt-driven by an Allis-Chalmers 75-hp. 2200-v. induction motor, the crushed rock passes directly to a bucket elevator. The elevator carries the material through a 95-ft. lift to the top of the machinery building, where it is delivered to a Fairmont live-roll grizzly screen (Fig. 2) for scalping. This grizzly consists of a series of seven revolving shafts with disks that are arranged to give square openings through which the material can pass. Below the disks, there is a series of spring steel fingers or scrapers, which serve to remove the material that adheres to the



General view of the plant from the finished storage side, showing the three delivery conveyors, and the method of loading for shipment

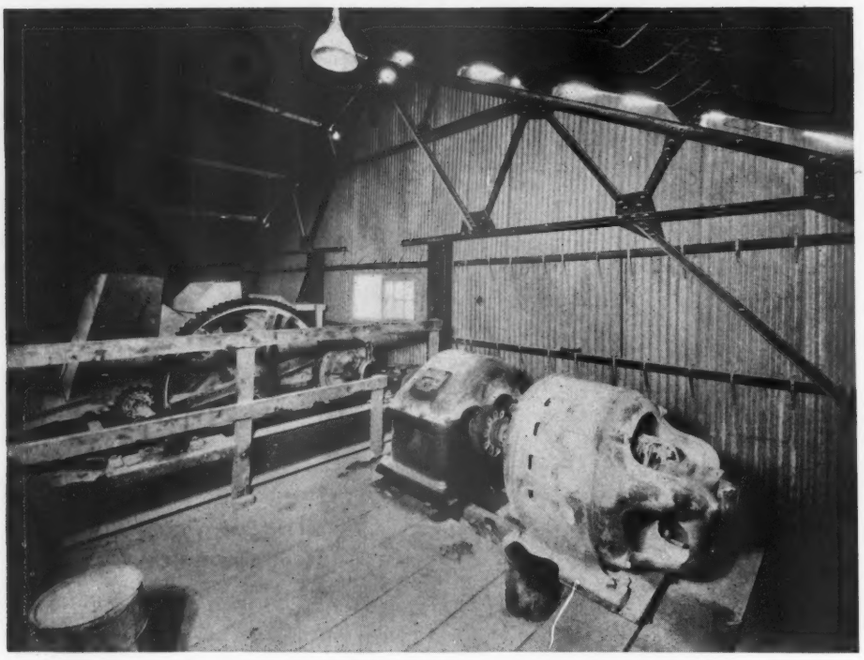


Fig. 3. The motor drive for the elevator and grizzly screen

disks, thus preventing the possibility of clogging the screen. The elevator and the grizzly are driven by a 40-hp., 2200-v. Allis-Chalmers induction motor, through a Foote herringbone 5.75 to 1 ratio reducer unit (Fig. 3). The main elevator shaft is driven through a disk clutch which is controlled from the floor below, at a point near the grizzly screen. Thus the elevator can be stopped quickly when desired. The screen is driven from the main elevator shaft by sprockets and steel thimble roller chain.

Material which passes over the screen, that is, the flux stone, or sizes 1¼-in. and over, is delivered to one of a group of six steel storage bins which have been built over a spur track for direct loading into cars. The undersize material is delivered to a belt conveyor which carries it to what was formerly the waste pile. This conveyor, which has a length of about 230 ft. and a 10-deg. angle of lift, is individually driven by a 10-hp. induction motor through a Foote worm gear reducer. It is the upper conveyor shown in Fig. 1. It dumps the rock into cars in which it is carried to various parts of the temporary storage pile.

Operation in the Open Season

The operation when the season permits washing is the same up to a certain stage. The material from the quarry is still crushed and delivered to the elevator as before, but a certain amount of material from the reclaiming storage pile is also delivered to the elevator and mixed with the material coming from the crusher. The method of carrying the rock from the pile to the elevator boot is as follows: From the pile it is loaded into a Fairmont hopper and reciprocating feeder by a Marion gas-electric, caterpillar crane and bucket. The feeder delivers to a 186-ft. Fairmont Timken-equipped belt conveyor, which in turn delivers it to the elevator hopper. Both the conveyor and the feeder are driven by a 10-hp., 220-v. Allis-Chalmers induction motor. The feeder is driven by a roller chain and sprocket from the tail shaft of the conveyor.

From the elevator the material is delivered to the grizzly screen, as described before, with the difference that a heavy spray of water plays on the material as it comes on the screen.

The flux stone from the grizzly goes to the bin for direct loading to cars, as before, and the undersize passes to a revolving washer, 25 ft. long and 6 ft. in diameter. The washer is of the roller trunnion type supported by four rollers. The interior of the shell is provided with angle riffles which agitate the material during its passage, and thoroughly clean it of clay. The cleaning action is facilitated by heavy sprays of water which play upon the material at intervals. The washer is driven by a 20-hp., 220-v. Allis-Chalmers induction motor through a Reeves variable speed unit, which gives a range in speed of from 6 to 18 r.p.m. This feature has been incorporated so that the thoroughness of the washing can be regulated with respect to the condition of the material as to included dirt.

From the washer the material goes to a revolving screen (Fig. 4) which sizes out the 1¼-in. to ¾-in. This goes either to storage bins over railroad tracks or to ground storage. The minus ¾-in. material goes to the first of two Fairmont standard vibrating screens, which screens out ¾-in. to ⅜-in., this also going either to a bin over railroad tracks or to ground storage. Material below ⅜-in. goes to the second Fair-

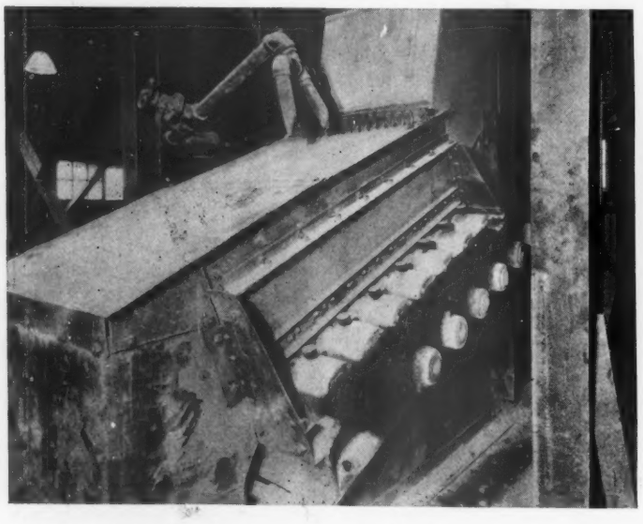


Fig. 2. Live-roll grizzy screen, showing the water pipes for summer washing entering at the top

Fig. 4. The revolving screen for sizing out material from 1 1/2 in. to 3/4 in.

mont vibrating screen, which screens out ⅜-in. to 3/16-in., this going either to a bin over the railroad tracks or to ground storage. Each of these materials is subjected to a spray of clean water before passing into its chute to remove any dirty water adhering to the particles. The minus 3/16-in. material and all of the water pass down a chute to a screw dewaterer and sand cleaner, the water and silt overflowing to a flume that passes over the railroad tracks to the river. The revolving screen is driven through a Foote worm gear by an individual 15-hp., 220-v. motor, and the vibrating screens are belt driven by a common 5-hp. induction motor. The vibrating motion is imparted by a crankshaft driven by belt from the motor shaft.

Disposal of the sized material from the screens is effected in the following manner: Each pocket of the screens is equipped with a chute which can deliver material either directly to the storage bin or to a short Fairmont Timken-equipped transfer belt conveyor, which in turn delivers on to a longer Fairmont Timken-equipped conveyor carrying material to the outside storage pocket. There are three such transfer conveyors, each about 44 ft. long, and three conveyors to the different storage pockets, these being 177, 117 and 62 ft. long, respectively. These discharge into pockets holding 1¼-in. to ¾-in., ¾-in to ⅜-in. and ⅜-in. to 3/16-in. material. All six conveyors (three transfer and three delivery) are driven by a single 15-hp. Allis-Chalmers induction motor through a line shaft which carries the sprockets for the delivery conveyors, and three bevel pinions which drive the head pulleys of the transfer conveyors through gears. Some idea of this arrangement can be obtained from Fig. 5. All the conveyors which are located outdoors, including the reclaiming conveyor, are protected over their entire length by galvanized iron hoods.

Roller Bearings Cut Power Requirements

The entire change to the plant was engineered and installed by the Fairmont Mining Machinery Co., of Fairmont, W. Va.

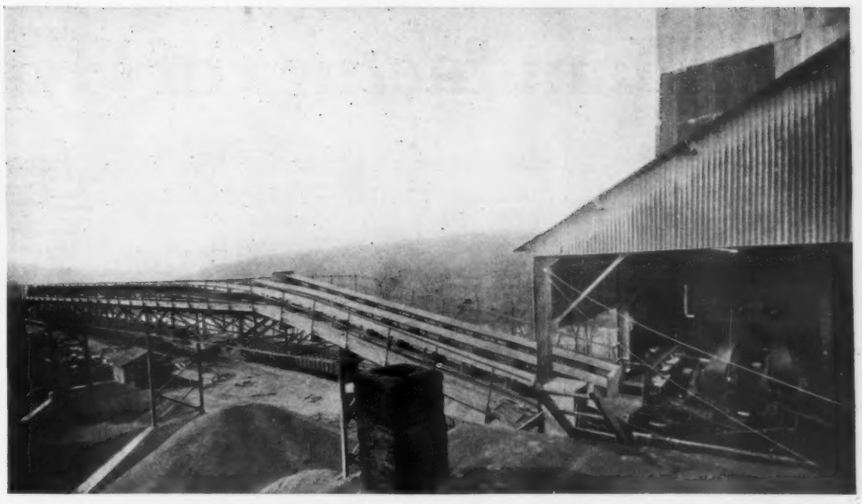


Fig. 5. View of the transfer and delivery conveyors. All six conveyors are driven by a single 15-hp. motor

One of the interesting features of the installation is that all the motors except those driving the crusher and main elevator, and all the conveyors except that delivering to the reclaiming storage pile, are equipped throughout with Timken roller bearings. The conveyors employ a new type of idler, developed by the Fairmont company. By a liberal employment of anti-friction bearings the power demand of the whole installation has been kept down, the whole load only amounting to about 250 kw. As an example, they have made it possible to drive six belt conveyors with a single 15-hp. motor, which would be difficult unless the conveyor friction was reduced to a minimum. Another reason for the selection of these bearings was the belief that they would render operation less expensive by reducing the amount of lubricating necessary to keep them working properly, and the time, labor and expense involved in renewing lubricant. With conveyors operating in exposed and dusty locations, as these are, such items can easily amount to a very material sum in operating costs under ordinary conditions. Practically the same consideration determined the choice of roller bearings for the motors.

The products are extremely satisfactory, the material being very well sized and quite free from dirt. There seems little doubt that many plants now selling only their flux stone could increase their profits appreciably by washing and sizing their smaller sizes, for which a ready market exists.

Proceedings of the Ohio Safety Congress Published

THE proceedings of the All Ohio Safety Congress, which was held at Columbus on November 9 and 10, 1927, have recently been received. These proceedings furnish the complete record of all of the sessions for the two days, both for the general meetings and for the various special sections. It may be possible to get some idea of the size of this conference when it is noted that the proceedings cover nearly 450 pages. The section relating to the quarry and mining industries presents an interesting discussion of safety work in the rock products field and should be well worth going over for any operator. Likewise, much of the discussion in the general sessions will be found of interest to producers generally. The Industrial Commission of Ohio is to be commended for its good work in publishing these proceedings.

Fig. 1. A portion of the 500,000-ton storage pile, with the hopper and the conveyor for handling material to the elevator boot shown to the right of the center

The Manufacture of Gypsum Plasters

Leaves from an Operating Man's Note Book—Part VI.—Finishing Plaster—Trouble Shooting—Casting Plaster

By W. B. Lenhart
Consulting Chemist and Engineer, Long Beach, Calif.

THIS TERM—finishing plaster—is given to those plasters, as the name implies, that are used for the outer or finish coat; and they usually consist of a slightly retarded, unfibered, aged stucco. The double-boiled material used to be taken for this purpose, but of recent years lower temperature stucco has replaced the former. As a matter of fact, double-boiled stucco is seldom used for any purpose whatsoever, the single-boil having been found just as good in all respects and cheaper and easier for the mill to make.

The amount of retarder added for finishing plaster varies considerably, and will run from a few ounces to several pounds. Many plasterers screen the fiber out of fibered hardwall and use that material for finishing purposes. Some mechanics ask that the fiber be left out at the mill, in which case a product known as "unfibered hardwall" is made, which is exactly the same as the fibered material with the exception noted.

Still other plasterers want a material that will set in 60 to 70 minutes, and for this purpose about 1 lb. of retarder per ton will give a satisfactory product.

Finishing plaster, as shipped from the mill, if mixed with water, neat, is far too sticky for the operator to use, and to reduce this sticky condition hydrated lime or lime putty is added. The operation is usually conducted in the following manner: Two buckets full of lime putty are dumped on the board and formed into a ring. The center of this ring is then filled with a measured amount of water. The amount of water used will depend upon the ratio of plaster to lime that is wanted. The plasterer now proceeds to sprinkle the finishing plaster into the water, without stirring, until all the liquid has been absorbed. At this point men, by means of their hawks and trowels, rapidly mix the two ingredients. This material is then applied to the wall at once, as it sets very rapidly, and troweling of the surface is continued until the plaster begins to set.

In some cases a small amount of sized sand is added to the above mixture to get the finishing effect that some desire.

Here we see a wide variation in the kinds of plaster used for finishing purposes, and a still wider range in the methods of their use, not to mention differences in the quality of the lime used and the method of its slaking. No wonder there are complaints that defy solution in the use of this product.

In some cases a plasterer, who has been accustomed to using screened fibered hardwall plaster, decides to use the mill manufactured product; and he has trouble with fast sets. He will then try to rectify his error by adding a small amount of retarder, and if care is not exercised he will overretard the batch. A handful of retarder will weigh approximately 2 oz., which if added to a few buckets full of plaster means an equivalent of 8 to 10 lb. of retarder per ton, which, with the retarder the material already has, means a product that will make 24 hours or longer to set. Of course, "the plaster is to blame."

One complaint in connection with finishing plaster of interest is, that after the batch has been applied to the work in hand it apparently sets up as it should. After 24 hours examination of the wall will show that the plaster has softened considerably or "gone back," as the plasterer says. The exact "why" of this condition is not definitely known, but it is fairly well established that if fresh stucco or any stucco that requires an excessive amount of water to get to working consistency is used for finishing purposes the chances of this trouble developing are good.

If the plaster, for any reason, is slow to give up the excess of water it has by evaporation processes, this rotting condition often occurs. This leads to the possibility that the excess water present redissolves the crystals of gypsum which are first formed. The lime probably enters into the reaction as well.

We know that this softening of the crystals can be duplicated by any of the following methods:

(1) Low temperature stuccos taken at temperatures from 250 to 280 deg. F. give an initial set of a few minutes, but the water left after the reaction is completed is slow to leave the pat. The sample pat after several days has a damp, clammy feeling and in many cases the plaster is not as hard as when first set up.

(2) By the addition of an excess of raw gypsum, which, in cold stucco, will accelerate the set, and then offset this condition by addition of an increased amount of retarder. This product after setting will act similar to (1).

(3) By mixing a stucco or retarded stucco and water in a mechanical mixer for comparatively long periods of time; that is, five minutes or more. The longer the material is left in the mixer the more noticeable is this property of not drying out and the softening of the set material.

With these facts in mind it is easily possible to supply a product consisting of a properly aged stucco (either by storage or artificially) of the desired retarder content, in which case troubles of this nature do not develop.

Artificial Ageing of Stucco at the Mixer

If water is sprayed in a fine mist into a suitable mixer containing hot gypsum stucco a fairly satisfactory aged product can be made. The amount of water added at this point will depend upon the temperature of the stucco. The hotter the stucco the more water that can be sprayed with safety. The following table shows these temperatures and amounts commonly permissible:

Temp. deg. F.	Gal. of water
270	10
260	9
250	8
240	7
230	6
220	4
200	3

In practice, water is not added unless the stucco has a temperature between the limits given, and every effort is directed towards having the stucco at as high a temperature as possible without having to reheat.

The water must be run into the rapidly stirred mass in fine sprays, and as the time required for mixing is of importance, it is usually necessary to have several sprays.

The product can be sacked directly from the mixer, in which case lumpy plaster is liable to develop. These lumps are mostly due to accumulations on the walls of the mixer breaking off and mixing with the plaster. Lumps from this source are hard. On standing, soft lumps sometimes develop which can be traced back to an excess of water used for the temperature factor.

It is well to have the machine up to the working temperature before starting this operation by passing through several tons of hot stucco.

There is developed large volumes of steam from this operation, which have to be conducted away; and where the product is sacked direct from the mixer, this steam

continues to escape through the pores of the sack for some time.

If material of this nature is loaded into cars that have a ceiling of tin or metal, the steam will condense on the roof and drip back on to the top row of sacks, and by the time the car has reached destination the top row of sacks most likely will be unfit for use.

Where possible, sprayed stucco should be run to a suitable storage bin and left for several days. The product from the bin is then either screened or passed through a suitable grinder to remove the lumps that might be present. By mixing this product to redistribute the disintegrated lumps their effect will be diminished.

Cracking of Plaster—Causes and Prevention

This condition in 99 out of 100 cases cannot be traced to the plaster, or to the manner of its use, but is due to defective foundation for the mortar; either the lathing is improperly done or the building itself is settling. In some cases it can be traced to extremely slow-setting plaster, which has dried out before the hardening reaction has been completed.

Where a rich mixture of sand and plaster has been used, cracking can happen because of the expansion or contraction, the plaster not having filled the voids between the sand particles.

The chemist is often called upon to determine the amount of sand and plaster in the wall and has to do this work in the field. In this case all that it is necessary to do, is to remove some of the set plaster from the wall, place it in a cup and cover the material with water. Then with a stick break up the lumps of sand and plaster. Pour this sludge into a graduated column and shake vigorously, and then allow the solids to settle. After a short period of time the plaster settles out on top of the sand, and the two products can be readily noted. The total number of cubic centimeters of the pulp, the c.c. of the sand and the c.c. of the plaster are the basis of the calculation showing the sand to plaster ratio. Greater accuracy can be obtained by repeated shaking and settling of the material and using the average readings.

This method is rather crude, but is accurate enough for most cases, and its application is in determining wide variations in sand conditions. If a plaster normally carries 20 shovels of sand per sack, and for some reason only 18 can be used, the average plasterer will not complain, but where he is only able to use, say, 12 shovels per sack, the above method can be used to check his statements.

For more accurate results, chemical analysis of the sand and of the sanded plaster is necessary, and from these figures calculations showing the sand to plaster ratio can be arrived at.

Heat Rise in Setting Processes

Some interesting information is gained from a study of the heat rise in different stuccos and casting plasters. The heat generated is due to the reaction between the calcium sulphate and water.

These determinations are often made as complaints develop that casting plaster "burns" the mold. To explain what is meant here by this term: In the casting shops many of the objects cast of plaster are first shaped in wood or clay. This model is then coated with an emulsion stearic acid and kerosene. A good grade of cooper's glue is then poured over the object and allowed to solidify. When the glue has hardened sufficiently, the object is carefully removed. This glue mold having been cast with fairly thick walls is then used as a "negative" for casting the objects desired.

The casting plaster, which is usually aged stucco with a setting time of about 20 minutes, is mixed to the consistency of thick cream and poured into the glue mold and allowed to set. When the plaster has hardened sufficiently the walls of the mold are sprung to remove the cast, and the mold can be used repeatedly if desired. It is necessary to paint the inside of the glue mold with the stearic acid, coal oil emulsion toprevent the plaster from adhering to the negative.

If for any reason the plaster heats excessively, it remelts the stearic acid coating, and the glue as well, and thus destroys the cast and the mold. For this reason it is well to check the heat rise of the casting plasters from time to time.

Often, in an attempt to make a denser casting plaster, or one with greater strength, additional agents are added to the plaster; but care must be here exercised on account of the probability of these additions tending to scald the glue molds. Lime or hydrated lime added to casting plaster is an example. This alkali gives a harder cast and a glossy finish, but it is very apt to cause trouble from the above source.

In making the test to determine the heat rise, the usual method is to mix 100 grams of plaster with 60 c.c. of water, or enough to give a creamy consistency. This is allowed to set in an ordinary drinking glass protected from the air or drafts, so as to retain as much of the heat as possible. This protection can be easily obtained by making, out of casting plaster, a mold that will hold the drinking glass having the walls of the mold at least 1 in. thick. Allow this casing to dry out thoroughly before using.

Immerse a thermometer in the setting plaster, and every five minutes note the temperature. Continue to read the temperature for one hour after the pat has set, or at least until the mercury starts to decline. It is of interest to observe that the maximum temperature is secured from 20 to 35 minutes after the plaster to all outward appearances has set.

Following are several results on different casting plasters, in deg. F.:

Sample No.	A	B	C	D	E
Temp. at start	62	68	73	68	51
3 min.	62	68	73	68	56
6 min.	62	68	73	68	56
9 min.	62	67	72	69	55
12 min.	62	67	72	70	54
18 min.	*64	*67	71	*74	*56
23 min.	66	74	71	80	56
28 min.	68	82	*71	88	58
33 min.	78	87	73	90	62
38 min.	84	86	78	88	68
43 min.	84	82	83	84	75
48 min.	80	78	87	77	72
53 min.	76	76	93	76	64
58 min.	74	74	91	76	60
63 min.	74	74	91	76	60

*Indicates when pats set.

The above trials were made on casting plasters used in the West.

As these temperatures would indicate, none of the plasters have a heat rise sufficient to do any damage to the glue mold, and if the glue should be scalded it is probably due to some other cause.

Where a large cast is being made and the area exposed is small, a much higher temperature than those above given might be obtained. Addition of accelerators to cause a hastening of the setting time cause a more rapid reaction and will give a higher temperature reading.

(To be continued.)

Cleaning Phosphate Rock by Flotation

THE Bureau of Mines, Department of Commerce, has recently worked on the recovery of the fine phosphate rock which is lost in log washer overflows and screen undersize in the Florida fields. The process tried was that of flotation, using standard types of laboratory machines and mixtures of oleic acid and sodium oleate as flotation agents. The results obtained were excellent; in one case 84.6% of the phosphate rock content was recovered, which analyzed 75.1% B.P.L.

The rock and sand, the principal impurity, were ground in a tube mill to pass 48- to 65-mesh with 92% passing 200-mesh. In most tests roughing were followed by cleaning, which is the ordinary practice in the flotation of metallic ores. The best reagent tried was 1.6 lb. aleic acid per ton with smaller amounts of pine oil, sodium silicate and sodium carbonate. The cost of reagents worked out between 25 cents and 35 cents per ton of material treated, but it is noted that laboratory tests on flotation generally require more reagents than mill tests.

At present prices of phosphate rock the process has more of an academic than a commercial interest, but this may not always be true. The more important deposits of the Florida field are said to show signs of exhaustion and there are thousands and perhaps millions of tons of tailings with a considerable phosphate content that could be treated if the price would permit.

Serial No. 2880, published March, 1928, by H. M. Lawrence and F. D. DeVaney, gives a fairly complete description.

Hints and Helps for Superintendents

Machinery Installations

By F. J. McDonald
Cobleskill, N. Y.

THE installation of machinery is always an important topic, and I will relate some of my experiences in this line, trusting they may prove interesting to many readers of ROCK PRODUCTS.

The proper installation of a new machine is frequently all important to its successful operation. Always the proper plans or blue prints are sent with the machine and if they are followed one usually comes out all right. The difficulty is that so many will not follow instructions. I know of many purchasers of new gasoline engines that would completely ignore the instruction sheet and usually got into trouble for that reason.

The old style reciprocating engines (gas and steam) required a well constructed foundation. The modern electric motor with its absence of vibration will set on most any foundation or bolt up against the wall (if the supports are strong enough). But still there are many machines that require an exceedingly good foundation if they are expected to operate successfully, such as ball tube mills, coal grinders and many others too numerous to mention.

I have in mind a large tube mill (of the exhaust fan type) which was very poorly installed, although most of the installation was under the personal direction of a man from the factory. Not enough cement was used with the crushed stone and the arch of the foundation around the side (for the support of the jack shaft) was cast or molded in divisions, when it should have been in one solid block. When the shaft was in operation the whole section moved backward and forward to an alarming degree. The sprocket drive for the feed was 2 to 3 in. out of alignment and, of course, it caused trouble. The mill foundation was not in line or at right angles with the main building and when they came to set the 200-hp. motor for the drive it was found necessary to chisel or cut a large hole in the foundation wall of the main building. The motor was set up by a self-styled, would-be mechanic and the foundation bolts cast solidly in the concrete. Imagine the difficulty of setting the motor in line for the drive belt. It was necessary to use a jack screw and bend the bolts in order to get the proper alignment.

Of course most of us know that foundation bolts should be run through a pipe (old boiler flues are good) of suitable size to allow of a swing or variation in setting the machine in proper alignment. If extreme rigidity is required the pipe holes around the bolts can be poured full of concrete or lead, after the machine is properly set.

Like the house upon the sand or the stone foundation, if your new machine calls for a good foundation it is generally best to follow orders, as much future trouble may be avoided.

Showing how a track hopper can be built to suit a particular type of car

Adapting a Track Hopper to a Type of Car

BOTTOM DUMP cars are made in an almost endless variety of types, and conditions which fit one type of car may not be so good for another. The Fort Worth Sand and Gravel Co., of Fort Worth, Texas, found when they built their new plant that consideration of the type of car had to be taken into account in designing the track hopper. The gravel was brought into the plant over the line of the Rock Island railway, and consultation with the railway brought out the fact that cars with the "National" dump bottom arrangements could be had at practically all times.

This car has bottom doors hinged in the center and dropping down on both sides. So the track hopper was built with openings like those shown in the picture, the track being carried across the hopper on a bridge. Having the hopper adopted to the car makes unloading simple, quick and clean. There is no spilling of gravel around the edge of the hopper and the only reason a man is needed is to drop the doors and to start the gravel when it has been so compacted that it tends to bridge.

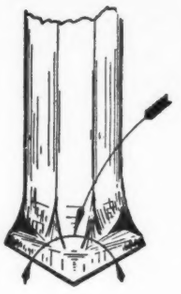


Fig. 1. Bit with an angle of pentration of 120 deg.

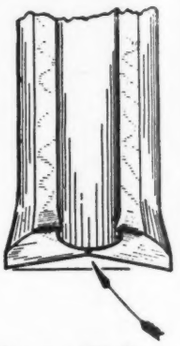


Fig. 2. Bit has a concave penetrating edge

Drilling Granite With Churn Drills

THE usual granite formation is very hard and abrasive, consequently is more difficult to drill than any other rock with the possible exception of quartzite and trap rock. Some granites are so abrasive that it is necessary to change bits every few minutes, as the gage of the bits wears down rapidly, and makes it difficult to maintain the original diameter of the hole, causing the tools to stick frequently. Most of this trouble can, however, be eliminated by proper dressing of the drill bits, and if the operator will only give a little study to this feature he will find that he can increase his progress to a surprising degree.

As already stated, the granites being hard and abrasive, it follows that the most important function is to penetrate and ream. The bit should be dressed with a wide angle of penetration (Fig. 1), which will form a thick, heavy cutting edge to withstand the impact of heavy tools on hard rock. The reaming edges must be kept out to full gage size and not more than 1½ in. back of the penetrating or cutting edge. The contour of cutting edge (Fig. 2) should be slightly concaved.

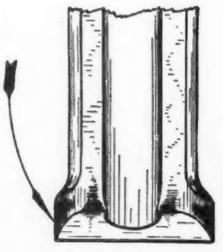


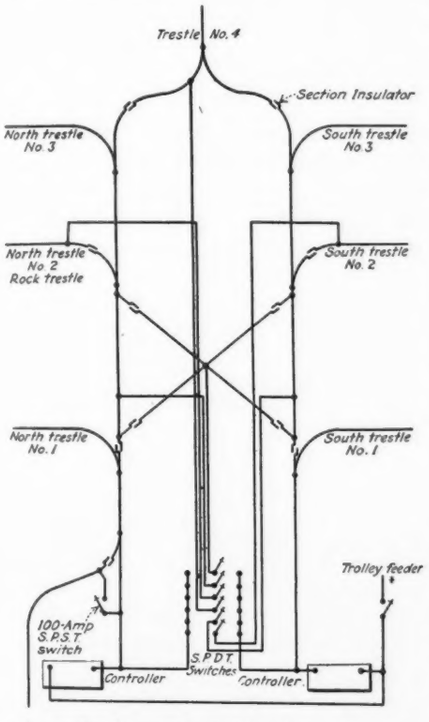
Fig. 3. Bit having a large area of wearing surface and no angle of clearance

Most important is the wearing surface (Fig. 3), which should be as near straight as possible, allowing a very small or no angle of clearance. The cross-section or body size of the bit should be large in order to guide the tools in the hole and prevent offset when seams or fissures are encountered.

In the case of drilling granites, little attention need be given to the functions of crushing and mixing as in shales and limestones, penetrating and reaming being the most important features, and if these are carefully developed to conform with the particular formation that is being drilled, it will greatly increase the progress of drilling and at the same time increase the service period between dressing of the bits, and decrease the time and labor required to keep them in proper condition.—*The Armstrong Driller.*

Operating Cars to a Stock Pile by Remote Electrical Control

AN UNUSUAL labor-saving arrangement of electrical apparatus employing remote-control equipment is used at the Ironton mine of the Corrigan, McKinney Steel Co. at Bessemer, Mich. Electrically operated cars move backward and forward over the stockpile trestle without anyone riding them. Dumping is automatic.



A stockpile trestle trolley layout operated by remote control

The trestle over the stockpile is divided into seven branches, each having its own track system, automatic latches and trolley circuit. Two remotely controlled cars, each driven by two 10-hp. direct-current motors, carry the ore from the shaft bins to any desired point along the trestles. The cars are fitted with a series solenoid which applies its brakes whenever power is turned off the motors. Each car is also equipped with a reversing contactor which changes the direction of motion each time power is applied. By this means, if a car is traveling in a given direction, it may be reversed by first cutting off power and then by again applying energy to the motors. This arrangement for controlling the direction of travel is made definite and safe by a system of electrical and mechanical interlocks.

The cars are always under the control of one man who is in a control room near the head of the shaft. Here he manipulates drum controllers which apply power to a trolley consisting of 12-lb. rails suspended over the cars. Power is taken by the cars through a sliding shoe which makes a pressure contact against the trolley. The trolley rail is supported at 40-ft. intervals by arches made of wood, which assist in insulating the current from the steel structure of the trestle.

No. 1 north and south branches near the shaft can be used by only one car with the present track layout; the remaining trestles can be used by either car. It is necessary only to operate the proper switches in the control room to direct either car over any section of track leading to or from the various trestles. One controller regulates car movements on one side of the stockpile track system and another on the other side.

Cars dump automatically when they reach a tripping device which unlatches the doors. Pressure of the ore opens the doors. When the cars run back over the tripping mechanism the weight of the doors locks the latch and the cars return to the loading chute.

Besides obviating the necessity for much labor, the electric, remotely controlled system makes it possible to carry on the dumping operation with the same speed, regularity and safety in all kinds of weather.—M. L. Dezendorf in *Engineering and Mining Journal.*

Bulldozing on an Excavating Job

By W. L. Home
Mining Engineer, Pine Plains, N. Y.

ON a large scale excavating job in the metropolitan district of New York the stone is a massive, hard, tough trap rock which is quarried out and crushed in a 42x 48-in. jaw crusher. The blasting is most difficult, as every shot must be covered by matts, and really heavy charges of dynamite are not allowed. On account of the amount of work required in covering up the shots block holing and mud capping were tried and found to be out of the question. Since no way has been found to break the stone sufficiently fine for the crusher on the primary shot the following scheme was tried and has proved to be quite successful:

A 10-ton electric crane was available and so was a large cast iron hammer from a pile driver. This hammer was attached to the crane hoist cable, raised up about 50 ft. and dropped on the large stones. In most cases this succeeded in breaking them in a few attempts at least. However, the hammer did not last long and a special pear-shaped weight of manganese steel, weighing about two tons, was made. This has done quite well, but should probably weight half again or twice as much. The car works on a bench above and ahead of the shovel and smashes up the big ones as they are uncovered. This is an old scheme around smelters and iron foundries, but is a little unusual around quarry plants. The crane runner gets to be quite a good marksman.

Safety in Verse

THE accompanying verses were posted on the bulletin board at the Portland, Colo., plant of the Colorado Portland Cement Co. immediately after the plant had completed a "no-accident" month in June with the idea

The safety flag still waves over the Colorado Portland Cement Co. plant

that they would help to maintain the good record of the month over a considerably longer period. The paraphrase is passed on to readers of Rock Products, who may find it also valuble in their own no-accident campaigns. The illustration shows that the flag "still waves" over the Colorado plant.

SAFETY FIRST AND ALWAYS

"Oh, say can you see
By the dawn's early light
How so proudly our flag
O'er our plant it still waves.
So, let us not stop
With our caution and care
But keep it in sight
'Til its threads are all bare."

Keystone Cement Plant Sold to John Barnes

ANNOUNCEMENT was made July 6 that the Keystone Portland Cement Co.'s plant, Bath, Penn., which is nearing completion, had been sold to John Barnes of Philadelphia, Penn. The amount involved is said to be in the neighborhood of $3,000,000. The plant will be materially enlarged by the new owner. Mr. Barnes is reported to be a broker.

New York State Crushed Stone Association Meets at Utica

ABOUT A DOZEN members of the New York State Crushed Stone Association met at the Yahnundasis Golf Club, Utica, N. Y., Friday, July 13. Bert Owens, of the Peerless Quarries Co., Utica, was host. After a little golf by some of the visitors, an enjoyable luncheon was served.

President George E. Schaefer presided over the discussion which followed the luncheon. It was largely an "experience meeting" on conditions in the territory generally. There was more discussion of terms and cash discounts put over from the two previous meetings. It was finally voted that the association should recommend: That the practice of billing customers 30 days net from the first of the month following date of shipments with 10c per ton off for bills paid before the 15th of the month was a good practice for all members and one already in effect with some of the members.

Newago Portland Cement to Build New Plant in Northern Michigan

ASSURANCE has been given Charlevoix, Mich., business men that the Newaygo Portland Cement Co. will begin building operations on a cement plant in the city within a short time. J. B. John, vice-president of the company, estimated that $1,000,000 would be spent within the next 15 months and that $500,000 had been spent in dredging a channel from Lake Michigan to allow freighters to load direct at the plant by the puenmatic cement pumping system.—*Lansing* (Mich.) *State Journal.*

Virginia Gravel Association Incorporated

AMONG the recent charters issued by Virginia State Corporation Commission is one dated June 29 to the Virginia Sand and Gravel Association, of Norfolk. John Twoby is president; E. J. Doran, secretary, and G. T. Smith was the third incorporator. The objects are "to promote and encourage the use of washed sand and gravel." E. J. Doran, named secretary, is an attorney of Norfolk.

Norman G. Hough Leaves Universal Gypsum and Lime Company

NORMAN G. HOUGH, one of the original organizers and recently general sales manager of the Universal Gypsum and Lime Co., Chicago, Ill., has resigned. His future plans are not announced, but he intends first of all to take a needed rest and vacation.

Mr. Hough is well known throughout the lime and gypsum industries. For several years he was manager of the Hydrated Lime Bureau at Pittsburgh, Penn., which was the original promotional organization of lime manufacturers. The Bureau was subsequently merged with the National Lime Association.

Norman G. Hough

Mr. Hough had formerly been with W. E. Shearer, when he was sales manager of the American Cement Plaster Co. With Mr. Shearer and some of his associates, who also resigned from the American company, Mr. Hough joined in founding the Universal Gypsum Co. a few years ago.

Tit for Tat in Nova Scotia Gypsum Dispute

A GREAT hue and cry arose in Nova Scotia over the levying of $1.40 per ton on gypsum, one of that province's chief products, by the United States. Many were the hot imprecations against the Fordney-McCumber tariff law and the hard-hearted customs officials who were said to be threatening the welfare of many workers in an important industry. But now it develops that the ruling of the United States customs officials is merely a copy of a Canadian regulation which has been in effect since 1909, the purpose of which was to keep out a small importation of United States gypsum from Ontario.

Thus the controversy between Canada and the United States on the gypsum duty becomes a controversy between the gypsum interests of Nova Scotia and those of Ontario. Aid of the Dominion government in settling the difficulty has been invoked by the Nova Scotia interests, who urge that the Ontario firms agree to a reduction in the Canadian duty. It is felt that the United States would follow suit, and thus the well-being of the Nova Scotia gypsum concerns would again be assured.—*Boston* (Mass.) *Transcript.*

[The story just quoted from the *Boston Transcript* is not altogether a true statement of the gypsum import controversy. The Nova Scotia gypsum deposits are largely owned by United States gypsum products manufacturers and the deposits are the sole source of an extensive gypsum products industry on the East Coast of the United States from Portsmouth, N. H., to Philadelphia, Penn. The real controversy is over the definition of the term crude gypsum.—The Editor.]

Pyramid Cement Plant Increases Output

THE OUTPUT of the Pyramid Portland Cement Co.'s plant at Des Moines, Iowa, has been increased practically one-third since the property was purchased by the Pennsylvania-Dixie Cement Corp. several months ago. Clement Miller, vice-president and general manager, declared that later this year plans will be formulated for a number of improvements which will further increase the capacity of the plant.

The business and sales offices of the company were moved into enlarged quarters on the fifth floor of the Insurance Exchange building recently. The move doubles the floor space and affords additional private offices for executives.

Mr. Miller announced that Hardy Macgrath, former district manager at Cincinnati for the Pennsylvania-Dixie corporation, has been transferred to Des Moines as new sales manager for the Pyramid, and that R. P. Mayer, former sales manager, has been transferred to Chattanooga.—*Des Moines* (Iowa) *Capital.*

Southern California Rock Products Association Has New Manager

CARL WIRSCHING has been appointed general manager of the Southern California Rock Products Association with offices at 430 Bartlett Bldg., Los Angeles, Calif., succeeding E. Earl Glass, who is manager of the Better Business Bureau of Los Angeles, and is still manager of three trade associations.

Editorial Comment

Misdirected Enterprise

Various local chambers of commerce and community booster organizations of one kind or another utilize a lot of energy and some money to bring new manufacturing concerns to their localities. The so-called development agents, or commercial development departments of railway companies often operate extensively along the same lines. In the southern states, recently bitten by the industrial development bug, the activities of these organizations is particularly noticeable. A recent example is the work of the Kentucky Progress Commission in inducing promoters of a new cement plant to locate in Kentucky.

Doubtless such activities in many instances are very laudable, and this American craze to expand incessantly is one of the prime characteristics of our day and generation. But one thought occurs to us in this connection. Granting that such local booster organizations owe it to their communities to exert every effort to get new industries, do they not also owe some consideration and regard to those few fellow citizens who are already located in their midst and are promoting the public welfare by operation of the same kind of industries? There is a portland cement plant in Kentucky now. Did it occur to the Kentucky Progress Commission to consult the citizens of Kentucky who own this plant to determine whether another was really needed? Did the commission obtain any expert advice whatsoever as to the real economic necessity of a new cement mill? What justification is there, if reports are true, for the Commission to promise in advance a generous share of the state's own cement requirements, as an inducement to the promoters of a new plant?

We know nothing of the merits of the case mentioned; we use it only as an example to ask a few pertinent questions which should be considered in *all* such cases. Railway commercial development departments, for example, should determine (and from known results apparently they don't) whether the rail business their old shippers are going to lose, through erection of unneeded new plants, is not going to be more than the business they may expect from these projected new plants. A good many people still seem to think that all you have to do to get rich is to produce a commodity. The bigger problem is too often how to dispose of it at a profit. With present production facilities in nearly all rock products lines the question usually simmers down to this: Can I produce enough cheaper than my competitors to make a profit on their costs of production?

The point is, irrespective of the merits of the particular case cited, chambers of commerce, commercial development departments of railways, state progress commissions, etc., etc., render public service *only* when they help to promote really needed industries. Apparently they consider the encouragement of promoters, generally, more essential than the protection of existing industries. Every business man ought to know that one manufacturing organization making fair profits is a far bigger asset to the community than two concerns breaking even, or within reach of bankruptcy and the sheriff. Only prosperous industries make prosperous citizens, and a prosperous city or state. A "ragged-edge," or losing, industry is as much a disgrace to its community as a colony of paupers, and is the cause of much misery to all classes of its citizens.

Use Available Useful Data!

The article in our July 7 issue on "Scientific Merchandizing of Crushed Stone Aggregate" seems to have attracted considerable attention — much more than we anticipated, because after all it was merely a description of modern sales methods. The novelty seems to be wholly in the fact that the commodity so merchandized happened to be a concrete aggregate. To our mind the article points the way that all producers of rock products must eventually follow if they are to keep pace with developments in business and industry generally.

The time is fast coming when a producer of a commodity who does not know more about it, and how to use it to the best advantage than anybody else, will be considered a back-number. More and more the user or ultimate consumer is expecting the producer to furnish knowledge of the product and expert service as a part of the bargain. It cannot be otherwise in this day of specialties, for no constructor, engineer or architect can hope to know all there is to know about *all* the materials he uses.

Whence comes all this knowledge and data that the far-seeing producer must grasp and assimilate? In this particular case Stanley M. Hands, whose operations we described, writes: "I think you should have stressed the point that the faculty of the engineering college at Iowa University and the Iowa City Engineers' Club had been privileged to hear a series of lectures by a representative of the Portland Cement Association on the design of concrete structures, and that these lectures were so well given and so well absorbed that all resistance there may previously have been to my line of sales argument was broken down." Mr. Hands adds: "Producers will do well to encourage the work of the Portland Cement Association by helping to arrange such lecture courses."

The series of lectures referred to by Mr. Hands have been given widely throughout the United States, but Mr. Hands is the first aggregate producer whose use of them directly to sell properly prepared aggregate has come to our attention. Doubtless there are others; certainly the opportunity that he grasped and used to advantage of both his company and his customer was not a peculiar one.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. com.[37]	12-30-27	3	7	
Allentown P. C. 1st 6's[37]	12- 5-27	90	92	
Alpha P. C. new com.	7-17-28	46	48	75c qu. July 14
Alpha P. C. pfd.[2]	7-17-28	117	.....	1¾% qu. June 15
Amer. Aggregate 6's, bonds	7-19-28	102	103	
Am. L. & S. 1st 7's[27]	2-24-28	101¾	102½	
American Silica Corp. 6½'s	7-18-28	99½	103	
Arundel Corp. new com.	7-17-28	40½	40¾	50c qu. July 2
Atlantic Gyp. Prod. (1st 6's & 10 sh. com.)[10]	7-18-28	103	109	
Atlas P. C. com.[9]	7-17-28	40	43	50c qu. June 1
Atlas P. C. pfd.	7-17-28	47	49	66⅔% qu. July 2
Beaver P. C. 1st 7's[30]	7-12-28	97	100	
Bessemer L. & C. Class A[4]	7-17-28	35	.....	75c qu. Aug. 1
Bessemer L. & C. 1st 6½'s[4]	6-29-28	100¼	101½	
Boston S. & G. com.[16]	7-14-28	79	85	$1 qu. July 2
Boston S. & G. 7% pfd.[16]	7-14-28	82	.....	1¾% qu. July 2
Boston S. & G. 1st pfd.[16]	7-14-28	87	.....	2% qu. July 2
Canada Cem. com.[43]	7-16-28	30	.....	
Canada Cement pfd.[43]	7-16-28	99	99½	1.62½c qu. June 30
Canada Cement 5½'s[43]	7-16-28	100¾	101¾	
Canada Cr. St. Corp. 1st 6's[48]	7-16-28	97	99	
Certainteed Prod.	7-18-28	42	42½	$1 qu. July 1
Cleveland Stone new st'k.	7-17-28	.....	77¾	50c Sept. 1
Consol. Cement 1st 6½'s, A[42]	7-19-28	94	99	
Consol. Cement 6½ notes[24]	7- 3-28	93	96	
Consol. Cement pfd.[41]	7-18-28	40	60	
Consumers Rock & Gravel 1st 7's[20]*	6-29-28	102½	103	
Coosa P. C. 1st 6's[32]	12-28-27	65	75	
Coplay Cem. Mfg. 1st 6's[40]	7-17-28	90	.....	
Coplay Cem. Mfg. com.[40]	7-17-28	12½	.....	
Coplay Cem. Mfg. pfd.[40]	7-17-28	72½	.....	
Dewey P. C. 1st 6's[20]	7-18-28	99	101	
Dolese & Shepard[7]	7-18-28	148	152	$2 qu. July 3
Edison P. C. com.[19]	7-14-28	No market		
Edison P. C. pfd.[19]	7-14-28	No market		
Edison P. C. bonds[19]	7-14-28	80	.....	
Fredonia P. C. 1st 6½'s[32]	12-28-27	97	101	
Giant P. C. com.[28]	7-16-28	25	30	
Giant P. C. pfd.[28]	7-16-28	32	36	3½% June 15
Ideal Cement, new com.	7-14-28	72½	74	$1 qu. July 1
Ideal Cement 5's	7-14-28	102	103	
Indiana Limestone 6's	7-14-28	95	95¼	
International Cem. com.	7-18-28	64	65	$1 qu. June 29
International Cem. bonds 5's	7-18-28	96	96⅜	Smi-ann. int. payable June 15
Kelley Is. L. & T. new st'k.	7-17-28	53	54	62½c qu. July 2
Lawrence P. C.[2]	7-16-28	105	109	2% qu.
Lehigh P. C.[2]	7-17-28	48	51	62½c Aug. 1
Lehigh P. C. pfd.[2]	7-17-28	108	110	1¾% qu. July 2
Lyman-Richey 1st 6's, 1932[13]	7-13-28	99	100	
Lyman-Richey 1st 6's, 1935[13]	7-13-28	97½	100	
Marblehead Lime 1st 7's[14]	7-13-28	100	.....	
Marbleh'd Lime 5½'s, notes[14]	7-13-28	98	.....	
Mich. L. & C. com.[19]	7-14-28	35	.....	
Missouri P. C.	7-18-28	42	42½	50c qu. May 1
Monolith P. C. com.[9]	7-12-28	15¾	16¼	8% ann. Jan. 2
Monolith P. C. pfd.[9]	7-12-28	9½	10	
Monolith P. C. units[9]	7-12-28	34¾	36¼	
National Cement 1st 7's[38]	7-13-28	99	101	
National Gypsum A com.[35]	7-18-28	22	24	
National Gypsum pfd.[35]	7-18-28	64	66	1¾% qu. Apr. 1
Nazareth Cem.[26]	7-13-28	31	33	75c qu. Apr. 1
Newaygo P. C.[1]	12-30-27	115	.....	
Newaygo P. C. 1st 6½'s[32]	2-11-28	120	.....	
New Eng. Lime pfd., A[45]	6-14-28	95	.....	
New Eng. Lime pfd., B[23]	7-13-28	97	99	
New Eng. Lime com.[23]	7-13-28	30	32	
New Eng. Lime 1st 6's[14]	7-13-28	98	100	
N. Y. Trap Rock 1st 6's	7-18-28	101½	101½	
North Amer. Cem. 1st 6½'s	7-14-28	82	84	
North Amer. Cem. units[19]	7-14-28	.....	48	2 mo. per. at 7%
North Amer. Cem. com.[19]	7-14-28	.....	10	
North Amer. Cem. pfd.[19]	7-14-28	.....	38	$1.75 qu. Aug. 1
North Shore Mat. 1st 5's[15]	7-19-28	99	.....	
Northwestern States P. C.[37]	11-21-27	165	170	
Pac. Coast Cem. 6's. A.	6- 1-28	.....	98	
Pacific P. C. new com.[5]	7-13-28	20	22	
Pacific P. C. pfd.	7-13-28	75	78	1.62½ qu. Apr. 5
Pacific P. C. notes[5]	3-22-28	99	.....	3% s.-a. Oct. 15
Pacific P. C. 6's.	7-13-28	.....	98	
Peerless Egyp'n P. C. com.[21]	7-17-28	1½	2½	
Peerless Egyp'n P. C. pfd.[21]	7-17-28	75	85	1¾% qu. July 1
Peerless Egyp'n P. C. war.[21]	7-17-28	No market		
Penn-Dixie Cem. 1st 6's[29]	7-18-28	98½	99	
Penn-Dixie Cem. pfd.[28]	7-19-28	83	.....	1.75 qu. July 1
Penn-Dixie Cem. com.	7-19-28	15¼	.....	50c qu. July 1
Petoskey P. C.	7-17-28	10	10½	1½% qu.
Pittsfield L. & S.[33]	10- 8-27	.....	100	
Pittsfield L. & S. com.[33]	10- 8-27	.....	25	
Riverside P. C.	7-13-28	180	.....	50c mo. June 1
Riverside P. C., A	7-13-28	21	24	
Rockland-Rockport Lime 1st pfd.[10]	5-17-28	.....	100	3½% s.-a. Feb. 1
Rockland-Rockport Lime 2nd pfd.[10]	5-17-28	.....	60	3% s. a. Feb. 1
Rockland-Rockport Lime com.[10]	5-17-28	No market		1½% qu. Nov. 2
Sandusky Cem.	7-17-28	203⅛	.....	$2 qu. July 2
Santa Cruz P. C. bonds	7-13-28	105¾	.....	6% annual
Santa Cruz P. C. com.	7-13-28	90	92	$1 qu. Apr. 1
Schumacher Wallboard com.	7-13-28	16½	17	50c May 15
Schumacher Wallboard pfd.	7-13-28	24¾	25	
Southwestern P. C. units[44]	7-16-28	270	.....	
Superior P. C., A[20]	7-12-28	46	48	part 27½c, Aug. 1
Superior P. C., B[20]	7-12-28	33	35	
Trinity P. C. units[37]	7-13-28	150	155	
Trinity P. C. com.[37]	7-13-28	48	.....	
U. S. Gypsum com.†	7-18-28	57½	59	40c qu. June 30
U. S. Gypsum, rts.	7-18-28	17	17½	
U. S. Gypsum pfd.	7-18-28	126½	.....	1¾% qu. June 30
Universal G. & L. com.[3]	7-18-28	1	1½	
Universal G. & L. pfd.[3]	7-18-28	10	14	1½% Feb. 15
Universal G. & L., V.T.C.	7-18-28	No market		
Universal G. & L. 1st 6's[3]	7-18-28	.....	60	
Upper Hudson Stone 1st 6's, 1951[32]	12-28-27	92	.....	
Vulcanite P. C. 1st 7½'s[32]	12- 5-27	105	109	
Chas. Warner com.	7-16-28	34½	37½	50c qu. July 10 & 25c ex.
Chas. Warner pfd.	7-16-28	109	.....	1¾% qu. July 26
Whitehall Cem. Mfg. com.[36]	7- 2-28	150	.....	
Whitehall Cem. Mfg. pfd.[36]	7- 2-28	98	.....	
Wisconsin L. & C. 1st 6's[15]	7-19-28	100	.....	
Wolverine P. C. com.	7-18-28	6½	7	15c qu. May 15
Yosemite P. C., A com.[44]	7-16-28	5½	6½	

†10% stock dividend, July 10. U. S. Gypsum common holders of record July 14 have the right to purchase new common at $20 a share to the extent of 50% of holdings. Right expires Oct. 1. Payments of 25% are due: Oct. 1, 1928; Feb. 1, June 1, and Oct. 1, 1929. *Called for redemption as of Sept. 1, 1928.

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willet, New York. [3]Quotations by Rogers, Tracy Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee Higginson & Co., Boston and Chicago. [11]Nesbit, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hoit, Rose & Troster, New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]Pirnie, Simons and Co., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago. [36]Hanson and Hanson, New York. [37]S. F. Holzinger & Co., Milwaukee, Wis. [38]McFetrick and Co., Montreal, Que. [39]Tobey and Kirk, New York. [40]Steiner, Rouse and Stroock, New York. [41]Hornblower & Weeks, Chicago, Ill. [42]E. H. Rollins, Chicago, Ill. [43]Jones, Heward & Co., Montreal, Que. [44]Tenney Williams & Co., Inc., Los Angeles, Calif. [45]Tifft Bros., Pittsfield, Mass.

INACTIVE ROCK PRODUCTS SECURITIES (Latest Available Quotations)

Stock	Price bid	Price asked
Asbestos Corp. of Amer., 5 sh. pfd., 5 sh. com.[1]	$1 for the lot	.....
Atlanta Shope Brick and Tile Co[1]	25c	.....
Benedict Stone Corp. (cast-stone), 50 pfd., 390 com.[1]	$400 for the lot	.....
Benedict Stone Corp. 1st 7's 1934[6]	.....	86
Blue Stone Quarry, 60 sh.[2]	$10¼ for the lot	.....
Eastern Brick Corp., 7% cum. pfd.[1]	40c	.....
Eastern Brick Corp. (sand lime brick) com.[1]	40c	.....
International Portland Cement Co., Ltd., pfd.	30	45
Globe Phosphate Co., $10,000 1st. mtg. bonds, $169.80 per $1000 paid on prin.	$50 for the lot	.....
Iroquois S. & G. Co., Ltd., 2 sh. com., 3 sh. pfd.[1]	$12 for the lot	.....
Knickerbocker Lime Co.[4]	105	.....
Missouri Portland Cement Co., 7% serial bonds	104¾	104¾
Olympic Portland Cement Co.[7]	.....	£1⅝
Phosphate Mining Co.[1]	1	.....
River Feldspar & Mill'g Co., 50 com., 50 pfd.[1]	$200 for the lot	.....
Rockport Granite Co., 1st 6's, 1934	90	.....
Simbroco Stone Co.[2]	12	12
Simbroco Stone Co.,[9] 40 sh. pfd., par $50; 40 sh. com., par $10 (40 units)	$2 per unit	.....
Simbroco Stone Co.,[10] 10 sh. pfd., par $50	$10.25 per sh.	
Southern Phosphate Co.[6]	1¼	.....
Standard Gypsum Co., 10 sh. pfd., 5 sh. com.[1]	$35 for the lot	.....
Tensas Gravel Co., 180 sh. com.[1]	$1 for the lot	.....
Tidewater Portland Cement Co., 3000 sh. com.	$6525 for the lot	.....
Vermont Milling Products Co. (slate granules), 22 sh. com. and 12 sh. pfd.[6]	$1 for the lot	.....
Wabash Portland Cement Co.[1]	60	100
Winchester Brick Co., pfd., sand lime brick[5]	10c	.....

[1]Price obtained at auction by Adrian H. Muller & Sons, New York. [2]Price obtained at auction by R. L. Day and Co., Boston. [3]Price obtained at auction by Weilupp-Bruton and Co., Baltimore, Md. [4]Price obtained at auction by Barnes and Lofland, Philadelphia, on April 4, 1928. [5]Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. [6]Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass. [7]Neidecker and Co., London, England. [8]Auction sale of $1000, Barnes & Lofland, Philadelphia, March 31, 1928. [9]Price at auction May 2, 1928, by Wise, Hobbs & Arnold, Boston. [10]Price at auction, June 6, 1928, R. L. Day & Co., Boston, Mass.

Giant Cement Earnings

THE FOLLOWING statistics of earnings in 1927 and the balance sheet, as of December 31, 1927, are reported by the Giant Portland Cement Co., Philadelphia, Penn., as follows:

Calendar Years	1927	1926	1925	1924
Net profit after depreciation and taxes	$230,606	$584,912	$536,498	$458,491
Bank and interest, rents, etc	8,579	19,554	19,672	12,046
Total income	$239,186	$604,466	$556,170	$470,537
Deduct—Interest on bonds, etc	9,375	6,539	8,149	15,631
Federal income tax for year	23,916	72,957	63,929	49,461
Norfolk property written off	.....	.....	.....	148,181
Loss on dismantling machinery, etc	23,776	31,233	50,289	.....
Net income	$182,119	$493,737	$433,803	$257,264
Preferred dividends paid	(7%)130,998	(26)486,564	(17)318,096	(14)261,892
Balance, surplus	$51,121	$7,172	$115,706	def. $4,629
Shares of common stock outstanding (par $50)	22,085	22,108	22,121	22,126
Earnings per share on common stock	$2.31	$16.41	$13.69	$5.71

BALANCE SHEET DECEMBER 31

Assets:	1927	1926
Real estate, buildings, machinery, etc.	$2,914,988	$2,935,070
Cash	236,315	197,208
Notes and accts. receivable	66,949	142,259
Loaned on collateral demand notes	.....	50,000
Sundry debtors	2,875	3,051
Rents and interest receivable	495	939
Inventories	518,249	523,207
Deferred charges	15,535	25,646
Fund for redeeming bonds	19,657	29,960
Stocks and mortgages owned	6,022	6,404

Liabilities:	1927	1926
Preferred stock	$1,871,400	$1,871,400
Common stock	1,104,250	1,105,400
First mortgage 6's	89,000	100,000
Accounts payable	45,353	155,910
Customers' credit balance	1,064	2,381
Payroll and unclaimed wages	9,517	19,633
Accrued interest and taxes	26,116	76,359
Reserved for contingencies, etc.	18,757	18,756
Surplus	615,627	564,506
Total (each side)	$3,781,085	$3,914,345

Details of Consolidated Sand and Gravel, Ltd., Financing

A NEW CANADIAN sand and gravel producers' consolidation, known as the Consolidated Sand and Gravel, Ltd., Toronto, Ont., was noted in these pages June 23. We now have further details in connection with the financing, as follows:

Purpose of financing—Upon completion of the present financing the company will own and operate all the businesses and undertakings of the following companies either through ownership of the entire capital stock of the said companies or by direct ownership of all their business and undertakings:

1. Durham Stone and Sand Co., Lt., Durham, Ont.
2. Waterford Sand and Gravel Co., Ltd., Waterford, Ont.
3. Superior Gravel Co., Ltd., Paris, Ont.
4. Fuller Gravel, Ltd., Fuller, Ont.
5. Paris Sand and Gravel Co., Ltd., Paris, Ont.

Nature and history of business—All of the above companies are now engaging successfully in a fundamental industry, the supplying of sand and gravel (screened and crushed to size) to the railroads (for ballast work), the building trades and highways, bridge and other construction contractors. All are strategically situated with convenient and adequate railway facilities to serve their respective territories to maximum advantage and corresponding profits. Three of the companies have been operating for many years, the remaining two having been completed this year. All of the plants were located only after careful surveys and thorough tests which established the fact that the supplies of material required will last at the present rate of production 1,060,000 tons per annum—an average of 40 years. The management prides itself on the judgment displayed in the selection, location and equipment of its various plants.

Assets—As can be seen from the balance sheet, the net tangible assets are equivalent to $133 for each $100 share of preference stock, or $5.62 for each common share outstanding after deducting the par value of the preference shares.

Business on hand and available—The capacity of the company's five plants is 1,600,000 tons of stone and sand and 15,000 tons of stone dust per annum. The earnings statement is based on 1,060,000 tons of stone and sand and 9000 tons of stone dust. The management is of the opinion, from orders already booked for this season's shipments, that the output will increase relatively with general building and construction activity and road and railway ballast work. The city of Toronto permits exclusive of pavements and sewers for the first four months of 1928 were $7,402,221 and were $4,925,143 for 1927. Ontario contracts awarded in four months of 1928—$50,282,200, and 1927—$40,227,200. The province, counties and townships spent about $13,000,000 on roads in 1927 and this will at least be equaled this year.

Earnings—The certificate of the company's auditors, Robertson, Robinson, Armstrong and McCannell, indicates earnings for 1928 before providing for depreciation and depletion and federal income tax of $303,400. The management estimate the depreciation, depletion and income tax at $79,000, which deducted leaves $224,400, which is equivalent to nearly three times the annual dividends on the preference shares and after providing for the preference dividends is equivalent to about $2 per share on the 70,000 issued no par value common shares. While the earnings of two of the plants (not in operation last year) must necessarily be estimated for the purposes of this statement, it is interesting to know that the actual earnings of one of the companies for the five years ending March 31, 1928, averaged $88,698.11, or more than the annual dividends on the preference shares of the new company. For the three years ending March 31, 1928, the earnings from this plant alone averaged $105,133.21, while for last year its earnings were $138,590.13.

Voting rights and dividend safeguards—The holders of preference shares shall not vote unless and until the dividends on said preference shares are eight quarterly payments in arrears when they shall be entitled to elevt a majority of the board of directors.

No dividend shall be paid on the common shares of the company unless:

1. All cumulative arrears of dividends on the preference shares, if any, are paid or provided for.
2. There has been set aside in the sinking fund such amount as the auditors of the company have certified as requisite out of the net profits for the purchase or redemption of preference shares.
3. The company has a surplus of undivided profits over and above the dividends so proposed to be paid sufficient to provide for dividends on preference shares then outstanding for a full period of two years.

Management—This consolidation of existing companies represents the efforts of the active executives in the Durham and Waterford companies to purchase control of a business of which they have a complete knowledge and experience with a view to expanding it. Having every confidence in its possibilities, they are continuing to direct its operations on the new and larger scale now possible. John E. Russell, president; G. G. Robinson, general manager; F. W. Thompson, assistant manager; W. I. Newmarch, director, are all well and favorably known to the trades to which this business caters, and possess the ability and experience requisite for their respective positions in the new company.

BALANCE SHEET

(As at May 15, 1928, after giving effect to proposed financing)

ASSETS

Cash on hand		$111,000.00
Capital stock of subsidiaries taken at the value of		
(a) Gravel and sand ready for the market, and stores and supplies of subsidiaries	$ 20,119.00	
(b) Lands, bldgs., plant, equipment & sidings; and gravel and sand deposits of subsidiaries as appraised by the Canadian Appraisal Co., Ltd., as per tentative figures reported May 15, 1928	1,462,616.07	
		1,482,735.07
		$1,593,735.07

LIABILITIES

Capital stock:	
7% cumulative convertible redeemable preference shares (par $100) authorized and issued	$1,200,000.00
Common stock, no par value: Authorized, 100,000 shares Issued, 70,000 shares	70,000.00
Capital surplus	323,735.07
	$1,593,735.07

Iron City Sand and Gravel Company Bond Issue

STEIN BROS. AND BOYCE, Baltimore, Md., are offering $1,100,000 in first (closed) mortgage 6% sinking fund gold bonds of the Iron City Sand and Gravel Co., Pittsburgh, Penn. These bonds are redeemable in whole or in part on any interest date at 102½% and accrued interest upon 30 days' notice. They are coupon bonds of $1,000 and $500 denominations. Application has been made to list the bonds on the Baltimore Stock Exchange. The Union Trust Co. of Maryland, Baltimore, is trustee.

The following information was furnished by George Vang, president of the Iron City Sand and Gravel Co.:

The Iron City Sand and Gravel Co., incorporated in 1923 under the laws of the State of Pennsylvania, was formed to purchase the physical property of the Iron City Sand Co., of Pittsburgh, which company was in active and successful operation from 1891 to 1923. The present company is one of the largest producers and distributors of sand and gravel in the Pittsburgh district. The property is well located at various points of

central distribution on the Ohio, Allegheny and Monongahela rivers. The floating equipment of the company is unusually complete, consisting of steamboats (including the new large steamboat *Steel City*), towboats, steel barges, supply, lumber and boiler boats, etc., four dredges, including the *Elizabeth Pfeil* (electrically operated throughout), and a fleet of automobile trucks for local deliveries. During the past four years the company has expended over $800,000 for new property, including the new *Steel City* steamboat, steel barges, and other equipment. All of the property of the company has been and is maintained at a high degree of efficiency and its equipment compares favorably with that of any other company operating in the Pittsburgh district.

Capitalization—Upon completion of this financing, the issuance of new preferred and common stocks in exchange for those now outstanding and the acquisition of the stock of the Ohio River Sand Co., the Iron City Sand and Gravel Co. will have the following capitalization:

First mortgage 6% gold bonds, due June 1, 1940	$1,100,000
First preferred 7% stock (authorized $500,000)	257,300
Preferred stock, 8% cumulative (par $50)	575,000
Common stock, class "A" non-voting (no par value), 8500 shares	8,500
Common stock, class "B" voting (no par value), 12,400 shares	12,400

Purpose of Issue—The proceeds from the sale of this issue will be used to retire the existing bonded debt of the company, to pay off bank loans and furnish additional working capital and for other corporate purposes.

Security—These bonds are secured, in the opinion of counsel, by a first closed mortgage upon real estate, plants and floating equipment of the company appraised in December, 1927, by Day and Zimmermann, Inc., of Philadelphia, at a net sound depreciated value of $1,861,524. Property owned by the company, valued at $438,895, cannot be mortgaged under the laws of the State of Pennsylvania and is therefore not covered by the deed of trust. The company also owns the entire capital stock of the Ohio River Sand Co., whose property was appraised by Day and Zimmermann in December, 1927, at $190,542. The entire capital stock of this company is pledged with the trustee as additional security for this issue of bonds. All mortgageable property hereafter acquired by the company shall be subjected to the lien of the deed of trust except as to purchase money mortgages.

The company's statement as of April 30, 1928, as certified to by Haskins and Sells, after giving effect to the present financing, shows net tangible assets of $2,455,126, equal to $2,232 per $1,000 bond of this issue.

Earnings—The predecessor company, the Iron City Sand Co., was in continuous successful operation from 1891 to 1923. Since 1923, the present Iron City Sand and Gravel Co. has shown net earnings before depreciation and federal taxes, applicable to interest charges, as follows:

1924	$245,772
1925	258,328
1926	339,361
1927	300,076

This is an average of $285,884 per annum or four and one-third times interest requirements on this issue.

The earnings for the first five months of 1928 are substantially in excess of the earnings for the like period of 1927.

Sinking Fund—Beginning January 1, 1929, the company agrees to pay to the trustees monthly the sum of $11,500. Out of these payments the trustee is to set aside an amount sufficient to pay the next maturing instalment of interest and to apply the balance to the purchase of bonds in the open market at or below the call price. If no bonds are so obtainable, the trustee is obligated to call by lot a sufficient amount of bonds to exhaust the funds in its hands. All bonds so purchased by the sinking fund are to be cancelled. It is calculated that this sinking fund is sufficient to retire the entire issue at 102½ and accrued interest prior to maturity.

Issue—This issue is dated June 1, 1928, and matures June 1, 1940; bears 6% interest per annum, payable semi-annually (June 1 and December 1) at the Union Trust Co. of Maryland, trustee, without deduction for 2% federal income tax, with a provision that any state, district, city or county taxes up to 5½ mills will be refunded to resident holders if applied for within six months from date such taxes were due.

The bonds are callable in whole or in part at 102½ and accrued interest on any interest date upon 30 days' published notice.

Mortgage Provisions—The indenture provides that no dividends shall be paid on the present outstanding 8% preferred stock unless the net quick assets of the company, after the payment of such dividend, will be at least $250,000.

Insurance—The company is required to carry fire insurance to the extent of 80% of its real property, and both fire and marine insurance on its towboats and dredges to at least 75% of the full insurable value as determined by the Marine Underwriters Inspection Service of the Pittsburgh District, so long as any of this issue is outstanding.

Business—The sand and gravel business is developed through the dredging and washing of sand and gravel in the Allegheny, Monongahela and Ohio rivers in and near Pittsburgh. The sand is sharp, clean and of an unusually good quality. The gravel is a by-product which is used for various purposes, mostly for mixing in concrete in place of crushed limestone.

With the advent of good roads and the greater use of concrete in all lines of work, the development of the sand and gravel business in the past few years has been very rapid, and the prospects for future increased demands are excellent.

The acquisition of the Ohio River Sand Co. will give the Iron City Sand and Gravel Co. an increased consumption of approximately 125,000 tons, based on the average tonnage of the Ohio River Sand Co. for the last several years. It will also permit the Iron City Sand and Gravel Co. to load approximately 200,000 tons of its car-load business 20 miles closer to its dredge than in the past; representing a saving of approximately $30,000 per year, based on a saving of 15 cents per ton, cost of towing sand over the 20 miles of river.

For handling the trade of the city of Pittsburgh proper, the Iron City Sand and Gravel Co. is in a peculiarly favorable position, as it has unloading wharves and distributing centers along both rivers which permits of rapid and economical handling to all points of the city and suburbs. It also has loading facilities on three of the trunk railroads that enter Pittsburgh.

Balance Sheet, April 30, 1928

(After giving effect as at that date to an appraisal of the property, and the proposed acquisition of the entire capital stock of Ohio River Sand Co., sale of first mortgage bonds, retirement of present funded debt, and issuance of new 8% preferred and class "A" and class "B" common capital stocks in exchange for the 8% preferred and common capital stocks now outstanding.)

ASSETS

Current assets:		
Cash in hand and on deposit		$ 138,641.10
Notes and accounts receivable (less reserve for doubtful accounts, $18,817.79)		228,886.48
Inventories (company's estimate)		36,411.92
Insurance premiums paid in advance		46,956.71
Total current assets		$ 450,896.21
Investments		$ 61,600.00
Property—Estimated cost of reproduction new as appraised by Day and Zimmerman, Inc., as of December 1, 1927, with additions to April 30, 1928, at cost	$2,846,013.90	
Less reserve for depreciation	594,247.27	
		$2,251,766.63
Good will		$ 150,000.00
Deferred charge—Prepaid interest and taxes, unamortized bond discount, etc.		118,567.25
Total		$3,032,830.09

LIABILITIES

Current liabilities:		
Notes and trade acceptances payable		$ 152,337.00
Accounts payable		149,220.09
Accrued interest and taxes		7,579.18
Total current liabilities		$ 309,136.27
First (closed) mortgage 6% sinking fund gold bonds, due June 1, 1940		$1,100,000.00
Capital:		
First preferred 7% cumulative capital stock:		
Authorized 5000 shares of $100 each; issued and outstanding, 2573 shares	$ 257,300.00	
Subscriptions 11 shares	1,100.00	
Preferred 8% cumulative capital stock:		
11,500 shares of $50 each	575,000.00	
Common capital stock of no par value:		
Class "A," non-voting—8500 shs.	8,500.00	
Class "B," voting—12,400 shs.	12,400.00	
Capital surplus	769,393.82	
Total capital		$1,623,693.82
Total		$3,032,830.09

NOTES—The company is contingently liable at April 30, 1928, for discounted notes receivable in the amount of $29,424.31.

The dividend of 1¾%, due May 1, 1928, on the first preferred 7% cumulative capital stock was paid April 30, 1928.

Erratum

THROUGH a typographical error the recently announced dividends of the Charles Warner Co. were incorrectly listed in the July 7 issue. The dividends are as follows: 1st and 2nd preferred stock quarterly dividend of 1¾%, payable July 26; common stock quarterly dividend of 50c and extra dividend of 25c, payable July 10.

Limestone Products Corp. to Pay Preferred Dividends

THE DIRECTORS of the Limestone Corp. of America, Newton, N. J., announce a 4% dividend on preferred stock, payable at state intervals. This corporation is regarded as one of Sussex county's (New Jersey) biggest industrial enterprises. From a small beginning it paid out in wages the past year $100,000. It has invested at this writing $600,000. Since its inception the earnings of the corporation have been invested in the enlargement and increase of the plant. Additional extensions to the big concern are in mind, which it is the intention of the company to be made in the near future.—*Newton* (N. J.) *Herald.*

June No-Accident Drive Sets Safety Record for Cement Industry

Accidents 20% Less Than in June, 1927, and 138 Plants Operate with Clean Slates

By J. Alton Reitzel

JUNE, 1928, saw another safety record set in the cement industry. Last year when the annual June No-Accident drive was over it was thought the bottom had almost been reached in eliminating mishaps. But when the final tabulation was made of this June's accidents it was found they were 20% less in number than for the similar period last year.

Forty-six lost time accidents and one fatality for this June represents the lowest number of accidents in the history of the industry. In June, 1927, 59 lost time accidents were suffered by the industry and one fatality.

While accidents dropped 20%, the number of mills reporting increased 11%. The safety record for 1927 was set with 145 complete plants reporting—during June, 1928, 162 plants were entered in the drive. When the drive closed at midnight on June 30, 138 mills had kept their safety banners flying for the entire 30-day period. Last year only 124 flags were flying when the month's drive ended. The whole number of accidents this year occurred in but 24 mills.

As the plans for the annual no-accident drive got under way this year one question was uppermost in the minds of everybody connected with the industry: "Can we repeat?" It was thought that accidents had been reduced to about a minimum in 1927 and to bring them down still further was almost an impossible job. In addition to this factor a large number of new men were in the employ of the cement industry, new mills had been or were being erected, large additions to present plants under way and a large volume of construction.

Better 1927 Record

With all these additional hazards present it seemed doubtful whether the accident record for June, 1927, could be broken. But by the combined efforts of every worker and every executive in cement plants of this country, Canada and South America the accident record was not only equaled but bettered this June.

During the month of April this year special warning was sent to member companies of the Portland Cement Association telling them to be on the lookout to guard against mishaps. Tell-tale accidents were happening showing that extra care would have to be exerted to clear the way for the annual drive. The safety organizations started intensive action and as a result May, 1928, was the safest month on record with the exception of June, 1927, and June, 1928.

A comparison of the number of accidents

Where the safety flag flies when there are no accidents—topped only by the national colors

in the month of May for the past four years shows a startling reduction. These figures show conclusively just how much has been done by the industry to cut personal mishaps.

May, 1925	May, 1926	May, 1927	May, 1928
234	174	112	85

The intensive safety work in May prepared the men for the June drive. In other words, every employe was in the spirit of the campaign even before the banner was raised to its place beneath the American flag on the first day of June.

Nearly 50,000 men signed pledge cards this year promising to work free from accident—also that they would endeavor to help their fellow-employes to work safely.

Starting the organization of the June No-Accident drive every active mill executive signed the papers guaranteeing the best co-operation his company could give. After the head of the organization had been enrolled every superintendent signed up his mill. Next in line the foremen inspected their departments and signed documents to the effect that they were ready for the drive and would do everything in their power to operate a month without mishap. Finally every individual worker signed his pledge card.

With this type of organized safety drive every man in the plant organization feels his responsibility for the success of the drive. And every man in every department must co-operate if his plant is to keep the safety banner flying for the entire month.

Regional Safety Meetings

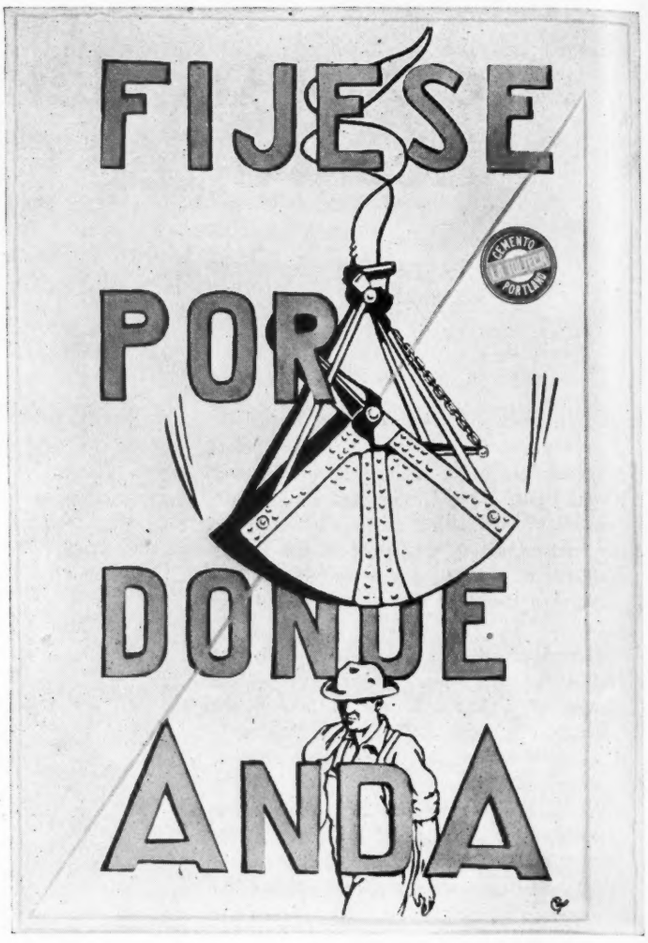
In addition to the preparation for the June drive by organizing every man in each company, 11 regional safety meetings were held during the early spring and summer. At these regional safety meetings executives, safety committees and workers met to discuss the safety problems of their individual plants. Definite plans were made for conducting the June drive.

The green and gold safety banners were dedicated on May 12 by the 10 mills winning trophies for a year of safe operation during 1927. The following letter was sent by A. J. R. Curtis, secretary of the committee on accident prevention and insurance of the Portland Cement Association, to the superintendents of the trophy winning plants:

"As secretary of our Committee on Accident Prevention and Insurance, it is my rare pleasure, acting under authority of Chairman J. B. John, to designate your mill as one of the 10 organizations to dedicate the official flag of the June No-Accident campaign of 1928.

"In selecting the mills for this special honor, we have designated the 10 trophy winners for 1927—worthy standard bearers of a magnificent flag unfurled in the most beneficient struggle of our age.

"You are asked to dedicate the flag on Saturday, May 12, at or as near the hour of 2:30 p. m. as practicable, asking your safety committee and as many of your workmen as may be desirable to congregate at the base of the plant flag pole and after reading the enclosed words of dedication



Four posters that were used during the June No-Accident drive by the "La Tolteca" Portland Cement Co., of Mexico

hoist the flag, keeping it at the masthead below the national flag until sunset.

"You are asked not to again fly the flag until sunrise June 1, but in the meantime to keep it on display as suggested in the instructions accompanying the flag. The dedication ceremony may be added to in any way you may desire. The flag should reach you about May 10, but you are requested not to reveal its nature until the above ceremony.

"Best wishes for a successful dedication and again—congratulations to your mill on its selection for this special mark of honor and distinction.

"Very truly yours,

"(Signed) A. J. R. CURTIS."

To dedicate the safety banners to a safe month of operation the following speech was read at each of the 10 dedication ceremonies:

"Fifty thousand men, working in the wide-flung reaches of the portland cement industry, will work under the flag we are raising today. They will guard it—not by acts of carelessness, but by a careful, thinking effort. They will cherish it as a symbol of safety, they will guard it well, for it means the happiness of their loved ones as well as themselves.

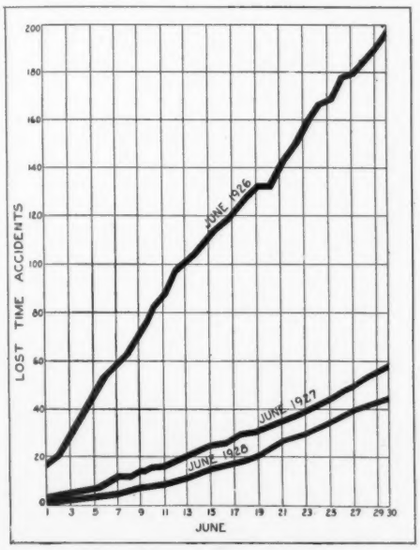


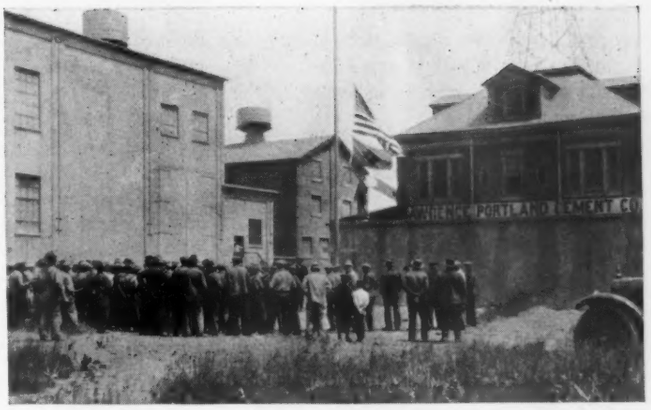
Chart showing how the June drive this year resulted in an even better record than June, 1927

"There is no substitute for a careful man. And as the safety banner unfurls to the breeze may we not pledge added efforts for the safety of our comrades and may we not look forward to a day when accidents shall be banished from our plants. Safety follows wisdom—let us take a sacred pledge to do our part in working safely not only during June but as long as we are privileged to continue in our industry.

"We dedicate this safety banner with the admonition to every worker in every plant: Keep the safety flag flying—it means prosperity, health and happiness to all of us.

"We consecrate this banner to the most beneficent struggle of the age—the fight against accidents."

The last day of May every plant held a mass meeting for the employes. At this time work for the coming safety campaign was outlined and the safety committees told of their plans to keep the safety flag flying.



Flag going up pon the first of June at the Lawrence Portland Cement Co. plant

At the close of another successful June No-Accident drive it is interesting to look over the safety record for the past few years from a standpoint of production and safety. In 1919, when the first accident reports were received by the association, there were 2067 accidents for every 100,000 bbl. of cement produced. Four years later, in 1923, this rate had jumped to 2.36 accidents for every 100,000 bbl. produced. In 1925, when safety work was really started in earnest, the accidents for 100,000 bbl. production had been cut to 1.618. A further reduction to 1.35 was effected in 1926. Last year less than one accident for every 100,000 bbl. was attained. The figures show 0.96 accidents for 1927.

That safety work is arousing real interest among the men themselves is evidenced by the fact that many mills are requesting to keep their safety flags to try for a better record in July. Mills that had no accidents in June are trying to stretch the period to two months free from mishaps. The mills that suffered accidents in June are anxious to vindicate themselves.

As a matter of interest—if July's accidents are kept at a minimum, the industry will see a record set for three months' operation from the point of view of safety. May was a low accident month; June was the best month ever seen in the industry; July needs only to keep accidents to a minimum.

Last Regional Meeting Until Fall Held at Pittsburgh

ON TUESDAY, JULY 10, the eleventh regional safety meeting of the year was held by the Portland Cement Association for the benefit of the cement mill operating organizations in Western Pennsylvania, Eastern Ohio and West Virginia. It was the last of the series scheduled for the spring and summer, the next meeting being planned for San Francisco on Tuesday, October 2.

The Pittsburgh region has long been a center of safety enthusiasm and the increase in attendance at this meeting over the similar occasion last year was very gratifying. General sessions, morning and afternoon, were held in the Italian room of the William Penn hotel, excellent arrangements having been made by the local committee consisting of E. D. Barry, superintendent of the Universal Portland Cement Co., Pittsburgh; G. A. Saeger, chemist of the Crescent Portland Cement Co., Wampum, Penn., and A. C. Toner, manager of mideastern offices of the Portland Cement Association.

Francis Feehan

Mr. Barry called the meeting to order at 10:15 a. m. and presided at the morning session. The secretary presented an encouraging report covering the accident record of the mills of this vicinity for 1927, indicating that in lost-time accidents they averaged better than the general average for the country. The 11 mills in the Pittsburgh area which were included in the Portland Cement Association's reporting system last year suffered 46 lost-time and 5 fatal accidents. These averaged about 4.2 lost-time accidents per mill as against the general average of 10 per mill for the country as a whole. The five fatal acci-

W. H. Boyce

dents, however, averaged twice the number reported from the plants throughout the country. The individual standings of the mills around Pittsburgh is indicated by the following:

One mill had 17 lost-time accidents.
One mill had 12 lost-time and 1 fatal accident.
One mill had 6 lost-time accidents.
Two mills had 3 lost-time and 1 fatal accidents each.
Two mills had 2 lost-time accidents each.
One mill had 1 lost-time and 1 fatal accident.
One mill had 1 fatal accident.
Two mills had no lost-time or fatal accidents.

It was the general opinion that the spread was too great between these records and that if some of the mills could operate free, or very nearly free, from personal injury accidents, the others could find some means by which to improve. Other program features were as follows:

"How We Won the Association Safety Trophy," Wesley Davy, chief engineer, Lehigh Portland Cement Co., New Castle, Penn.

"The Trophy Dedication at Ironton Plant," W. H. Hamilton, chief engineer, Alpha Portland Cement Co., Ironton, Ohio.

"Taking Mill Safety Work to the Community," A. J. Eales, safety director, Bessemer Cement Corp., Youngstown, Ohio.

General discussion of accidents and safety work in the various departments led by the following: Quarries, mines and clay pits, Charles H. Bolyard, chief engineer, Alpha Portland Cement Co., Manheim, W. Va.; crushing departments, V. Diefenderfer, superintendent, Wellston Iron Furnace Co., Superior, Ohio; raw mills, W. P. Rice, superintendent, Crescent Portland Cement Co., Wampum, Penn.; burning departments and coal mills, A. C. Hiscox, superintendent, West Penn Cement Co., Butler, Penn.; finishing mills, A. J. Little, superintendent, Sandusky Cement Co., Bay Bridge, Ohio; power departments, J. B. Zook, chief engineer, Great Lakes Portland Cement Corp., Buffalo, N. Y.; packing and shipping and yards, J. R. Cline, assistant superintendent, Universal Portland Cement Co., Universal, Penn.

Robert Parsons, superintendent of the Columbia Cement Division of the Pittsburgh Plate Glass Co., presided at the afternoon session at which the above general discussion was presented.

The luncheon provided a most informative as well as pleasant period between morning and afternoon sessions. Francis Feehan, safety commissioner of the United States Bureau of Mines, acted as luncheon chairman and introduced as the speakers G. H. McClain, safety director of the Jones and Laughlin Steel Co., and J. P. Annin, manager of the Cement Information Bureau of New York, as well as several extemporaneous speakers aiding the Boy Scouts trip from New York to San Francisco over the Lincoln Highway, in the interests of highway safety. Mr. McClain was enthusiastic in his praise of cement mill safety work, but warned that it was much harder to remain on a pinnacle than merely to attain that exalted position. Mr. Annin spoke seriously of the menace which foreign cement now offers to workmen in American cement mills. He pleaded for "safety first" by the government in protecting the present high standards of living among our workmen and explained the need for a protective tariff on cement.

At the dinner, W. H. Boyce, president of the Western Pennsylvania Safety Council, presided as toastmaster. Mr. Boyce, who is superintendent of the Pittsburgh Railway Co., introduced Ad. Carter of New York, creator of the "Just Kids" cartoon strip and "Just Kids" Safety Club for children, and Hon. Harry Immel, director of the Bureau of Inspection of the Pennsylvania State Department of Labor and Industry. Mr. Carter presented a safety chalk talk and demonstrated how humor is being devoted to public safely problems. Mr. Immel discussed problems of industrial safety and exhibited keen interest in the progress of accident prevention work in the cement mills.

The meeting was one of the most interesting held this year. The registration was as follows:

Alpha Portland Cement Co.
John A. Dole, Ironton, Ohio.
W. W. Hamilton, Ironton, Ohio.
Dr. George Hunter, Ironton, Ohio.
Charles H. Bolyard, Manheim, W. Va.
Phillip Brutto, Manheim, W. Va.
H. H. Davis, Manheim, W. Va.
D. A. McVicker, Manheim, W. Va.
W. B. Shaver, Manheim, W. Va.
L. M. Smithe, Manheim, W. Va.

Bessemer Cement Corp., Bessemer, Penn.
Paul Cigul.
A. J. Eales.
R. N. Hardesty.
John Luegio.
J. E. McIlvenny.
D. C. McKee.
C. D. Montgomery.
C. C. O'Neil.

Crescent Portland Cement Co., Wampum, Penn.
W. S. Bradshaw.
John Brommer.
John Cunningham.
Philip Day.
E. W. Depew.
Edw. Elphie.
Charles Guy.
F. L. Herbert.
F. M. Miles.
W. P. Rice.
Geoff. A. Saeger.

The Diamond Portland Cement Co., Middle Branch, Ohio.
Albert Allison.
Lee P. Glennan.
George W. Heming.
Wilton Stull.

Great Lakes Portland Cement Co., Buffalo, N. Y.
C. J. Smith.
D. D. Hammond.
J. B. Zook.

Lehigh Portland Cement Co., New Castle, Penn.
Wesley Davy.
William H. Klukner.
Charles H. Schlicher.

Pittsburgh Plate Glass Co., Columbia Cement Division, Zanesville, Ohio.
J. F. Karn.
I. C. McCoy.
Lawrence McLean.
H. T. Moore.
Robert Parsons.
W. E. Rucker.
J. H. Sebaugh.
C. Foster Stine.

Sandusky Cement Co., Bay Bridge, Ohio.
Paul Grahl.
A. J. Little.
A. Wobser.

Universal Portland Cement Co., Universal, Penn.
J. W. Baine.
E. D. Barry.
Gust Berg.
Mathew Bertorich.
Frank Blazek.
Thomas Blaskovitch.
George Buckingham.
Steve Cervanyak.
R. E. Clark.
J. R. Cline.
Theodore Cosanovick.
E. W. Davenport.
C. N. Deem.
Thomas Deem.
Frank Dapra.
L. F. Doyle.
Nick Evan.
H. E. Eversole.
Jacob Lavlenka.
C. F. Lipovich.
E. H. Loveday.
George Marovich.
Joseph Nemec.
Frank Novak.
Thomas P. O'Connor.
Edgar C. Raley.
William R. Rowan.
Gaetano Ruggieyo.
W. H. Scott.
Frank Seaman.
Angelo Di Leuahio.
Manuel Simon.
R. L. Slocum.
Rufus Strickland.
Giovammi Tomasso.
Henry G. Viehich.
A. R. Westin.

H. D. Immel

West Penn Cement Co., West Winfield, Penn.
H. J. Balzer.
F. P. Sloan.
J. A. Younkins.

The Wellston Iron Furnace Co., Superior, Ohio.
V. Diefenderfer.

Portland Cement Association.
A. J. R. Curtis.
A. C. Toner.

United States Bureau of Mines.
Francis Feehan.

Others.
J. P. Annin, manager, Cement Information Bureau, New York.
Ad. Carter, creator of "Just Kids" safety cartoons, New York.
G. E. Clarkson, manager, Western Pennsylvania Safety Council, Pittsburgh..
W. H. Boyce, president, Western Pennsylvania Safety Council.
Harry D. Immel, director, Bureau of Inspection, Pennsylvania State Department of Labor and Industry, Harrisburg.
A. P. Huckestein, supervising inspector, Pennsylvania State Department of Labor and Industry, Harrisburg.
G. H. McClain, safety director, Jones and Laughlin Steel Co., Pittsburgh.
Ted Prendergast, Pittsburgh *Sun-Telegraph*.

La Salle, Illinois, Cement Companies Contract Quarry Stripping

THE Winston-Dear Co., nationally known contractors, has started work on two large contracts of stripping rock for the Marquette and Lehigh cement plants in Oglesby, it was announced recently. The company, which moved its machinery to the quarries, is now recruiting a working force of 200 men.

It was stated at the company offices that the operations would require at least two years to complete. Work has begun in the Lehigh quarries and will be started on the Marquette property within a short time.

The company has large operations of a similar nature in Ohio, Missouri and other states.—*La Salle* (Ill.) *Tribune*.

Cowell Cement Mill Celebrates July 4 with Trophy Dedication

California Community Enjoys Safety, Speeches, Music, Banquet and a Grand Ball in the Cement Plant

WHAT was perhaps the most unique celebration ever held in a cement mill took place July 4 at the plant of the Cowell Portland Cement Co. at Cowell, Calif. It has been customary for several years for the mill organization to celebrate the national holiday with an entertainment at the mill. This year, however, the occasion took the form of a great safety jollification, commemorating the greatest collection of safety honors ever awarded to a cement mill or any other industrial plant with comparable hazards.

The Cowell mill was presented with the award of the Joseph A. Holmes Safety Association, by a representatives of the U. S. Bureau of Mines; it earned honorable mention for a perfect quarry record in the "Sentinels of Safety" trophy contest; it received the Portland Cement Association trophy for a perfect safety record during 1927, and on May 22 was accorded the distinction of being the first mill in the membership of the association to complete two years of operation without a lost-time mishap. In view of the splendid record of this mill it is easy to see why people of the community have come to look upon the cement plant as the safest spot for a Fourth of July celebration.

W. H. George, secretary and general manager of the Cowell Portland Cement Co., presided at the ceremonies incident to the dedication of the Portland Cement Association trophy and the presentation of the Holmes Award. Mr. George said in part:

"Ladies and Gentlemen: We are gathered together for our usual Fourth of July celebration. This time the occasion is more important to us on account of what we have been able to contribute to first aid and safety work. This would not have been possible had it not been for the complete co-operation of the entire staff, the foremen and all the employes. At this time I want to take occasion on behalf of the company to thank all of our employes for their co-operation in the past, and to say that we hope it will con-

The group gathered for the dedication of the safety trophy at the plant of the Cowell Portland Cement Co., at Cowell, Calif.

W. H. George, secretary of the Cowell Portland Cement Co.

tinue indefinitely, so that we may keep up the same accomplishment.

"You will surely be interested in what we have accomplished up to date. Our quarry department has gone 1054 days without a lost-time accident. Our complete plant operation at Cowell, including the quarry, has gone 784 days without a lost-time accident.

"Three years ago the Portland Cement Association inaugurated a 'No Accident Month for June,' and I am happy to say that we have gone through each June for the last three years without a lost-time accident. In addition to this the Portland Cement Association presents to each member plant who goes a full calendar year without a lost-time accident with a safety trophy which you see before you and which will be unveiled tonight. It is interesting to note that there are some 160 member plants of the Portland Cement Association scattered over the country and that our plant is the only plant west of the Rocky Mountains that has ever received one of these safety trophies.

"Our friends have been very kind to us. In addition to the safety trophy presented by the Portland Cement Association we are also to be presented with a certificate of honor from the Joseph A. Holmes Safety Association.

"In the last few days we have received many congratulatory telegrams. We have received two telegrams from A. J. R. Curtis, assistant to the general manager, Portland Cement Association, Chicago, Ill.; a telegram from J. B. John, chairman, committee on acciden' prevention, Portland Cement Association, and a telegram from G. S. Brown, president of the Portland Cement Association. Mr. Bresee will now read these telegrams, after which the program will start with the singing of the 'Star-Spangled Banner' by the Cowell school children."

Then followed presentation of certificate of honor from the Joseph A. Holmes Safety Association by D. J. Parker, district mining engineer, United States Bureau of Mines.

Mr. Parker said in part: "My instructions were to come out here to Cowell and present to the Cowell Portland Cement Co. the award of the Joseph A. Holmes Safety Association. The first director of the United States Bureau of Mines following its organization in May, 1910, was Dr. Joseph A. Holmes, who labored indefatigably to promote safety in the mining industry until he sacrificed his life by overwork and died on July 12, 1915. Following his death, some twenty-odd national organizations got together and formed what is known as the Joseph A. Holmes Safety Association in order to perpetuate the honor of Dr. Holmes and to keep alive the great work which he started in 1910.

"The director of the Bureau of Mines is automatically president of the Joseph A. Holmes Safety Association, which is very closely tied into the Bureau of Mines, and it is as a representative of the Bureau of Mines that I have this certificate here to present to the Cowell Portland Cement Co. for having operated their Cowell plant from May 11, 1926, without a lost-time accident."

E. D. Barnett, superintendent, accepted the certificate of honor on behalf of the company and its employes.

Then followed the speech, unveiling the safety trophy, presented by the Portland Cement Asociation, by Hon. A. F. Bray, city attorney of Martinez, Calif.

The Cowell trophy dedicated July 4, 1928

At the safety party on the occasion of the unveiling of the Cowell safety trophy

At the close of Mr. Bray's speech he called on Miss Isabelle C. George to unveil the safety trophy.

This was followed by the singing of "America" by the audience.

At the conclusion of the program the employes and guests returned to the Cowell Hall, where a grand ball was held throughout the evening and a banquet served.

Nebraska Highway Officials Object to 80c Gravel

GRAVEL is quite rare in Nebraska, or most parts of it, as readers of ROCK PRODUCTS probably know, yet according to newspaper reports the state highway officials are threatening to operate their own pits if they cannot get gravel for less than 80c per ton. It has been sold mostly for 60c per ton, but is getting scarcer all the time, and producers evidently have decided not to give it away any longer.

Trophy Unveiling Big Event at Martin's Creek

ON SATURDAY, JULY 7, was held the greatest jollification in the history of the little community of Martin's Creek, Penn., on the occasion of the dedication and unveiling of the Portland Cement Association safety trophy, won by the Martin's Creek plant No. 3 of the Alpha Portland Cement Co. for a perfect safety record in 1927.

The trophy, which was the first to be won by any mill in the Lehigh Valley, was the source of much interest, not only among the employes of the mill but also on the part of the large gathering of townspeople, friends and families of the employes and invited guests from other cement mills and from other industries in the vicinity.

J. L. White, superintendent of the Martins Creek plant

F. G. McKelvy, vice-president and head of the operating department of Alpha Portland Cement Co., acted as master of ceremonies and made the opening address. Following the singing of "America" the invocation was pronounced by Rev. J. O. Reagle, pastor of the Reformed Church of Martin's Creek.

G. S. Brown, who as president of the Portland Cement Association represented the donors of the trophy and as president of the Alpha Portland Cement Co. represented the recipient, occupied his dual position with dignity and pleasure. While Mr. Brown derived great pleasure in making the presentation, yet it was apparent to the assemblage that he took supreme delight in the accomplishment of the two Alpha mills at Martin's Creek and Ironton, which won the coveted prize by operating without accident during the entire year of 1927.

President Brown congratulated the men of the Martin's Creek mill and renewed his assurances to them that the management would back them up to the limit on accident prevention activities, in the future as in the past. He made a strong appeal for full co-operation of every workman, particularly in ridding the organization of any careless workers.

Moses Evert, member of the plant safety committee and foreman of a machine shop which has run several years without a lost-time accident, accepted the trophy with a fitting response in behalf of the men of the mill. Mr. Evert said that the employes were over-conscious of the genuine interest shown by the management and were sincerely grateful for the help and encouragement of the officials in backing the successful campaign against accidents last year. Mr. Evert and other speakers stressed the desirability and the possibilities of earning reinscriptions on the trophy for many more "safe" years.

Judge Robert A. Stotz of the Northampton County Court was the speaker of the day. Judge Stotz has an intimate acquaintanceship throughout the county, where hundreds of cement workers are numbered among his friends. His remarks stressed the importance of a clear accident record to everyday life of the community. He congratulated the men of the mill which was the first in the Lehigh Valley region to free itself and the surrounding community for a year from the distressing and often sad experiences due to injuries to workmen.

Judge Stotz expressed the wish that other industries throughout the country were as well organized as the cement manufacturers to combat the great mass of industrial accidents with their toll of life and limb. He pointed out that if men and women were as careful on the public highways as were the workmen of Martin's Creek cement mill No. 3, injuries to pedestrians from automobiles would be reduced to an inconsequential figure. The judge traced the progress of the medical profession during the last generation in the blotting out or reduction of many diseases, and aptly compared this progress with the results in accident prevention.

G. S. Brown, president of the Portland Cement Association, and F. G. McKelvy, vice-president of Alpha Portland at the trophy dedication

After the ceremony of unveiling the trophy a banquet was held in the nearby community hall, the meal being served by ladies of the local church.

The trophy stands in a conspicuous location on the main highway at the entrance to the mill property. It occupies a triangular grass plot which adds greatly to the attractiveness of the beautiful cast stone monument. Many autoists stop every day to admire and read its inspiring inscription. A large number of cement men from various parts of the valley district have already called to look it over, most of them returning to their own mills with a deep-rooted determination to "match Martin's Creek's trophy by 1929."

Two views of the new safety trophy at the Martins Creek Mill No. 3 of the Alpha Portland Cement Co. The trophy has been placed beside the main highway where all will see it

Foreign Abstracts and Patent Review

Process for Manufacture of a Siliceous Precipitate. DRP 444,363 of October 21, 1925. Kl. 80b. Siemens and Halske, Berlin-Siemensstadt. Inventor, Dr. Erich Krause, Potsdam. To obtain siliceous precipitates of great chemical resistance, the process recommends leading gases over the products which are to receive a coating, these gases consisting of a mixture of some neutral gas such as carbon dioxide or nitrogen with a carbon and hydrogen compound of silicon. Thus, for example, if a porcelain crucible is to be lined with such a precipitate, pure carbon dioxide is led through some heated hydrocarbon compound of silicon, such as silicon tetraethyl, and the resulting gases are made to pass over the crucible, which is brought to red heat upon elimination of air. The coating thus formed may consist of free silicon or of silicon carbide. It withstands prolonged and powerful heating in a blast in the presence of air. It is baked into the glazing without becoming oxidized. The hydrocarbon compound of silicon may receive admixtures of halogens; for example, diisobutyl-silicon dichloride may be used. Aside from porcelain, glazed or otherwise, the coatings may be applied to glass, metals, enamels, etc., as well as wire.—*Tonindustrie-Zeitung* (1928), 620.

Alumina Cement in Practice. Fritz Buechi describes the behavior of alumina cement in its application in various mixing proportions to concrete and mortar. Alumina cement was first patented in France by Jues Bied as ciment fondu or cement electrofondu. At the close of the last year the Societe de Lafarge et du Teil produced an average of 165 tons of ciment fondu per day. However, its manufacture has recently been extended to other plants, bauxite being used as the principal raw material. The compositions of the ciment fondu and of the so-called Alca-Schmelzzement of the Elektrozementgesellschaft compare with the ordinary portland cement as follows:

Element	Ordinary Portland	Alca Cement	Ciment Fondu
SiO_2	18 to 26%	10.11%	9.03%
TiO_2	.....	1.74	.....
FeO	1 to 6	4.25	5.60
Fe_2O_3	.....	1.80	0.97
Al_2O_3	4 to 12	42.31	40.48
CaO	58 to 66	38.80	41.50
MgO	.....	0.61	0.56
SO_3	.....	.....	0.66
S	.....	0.24	0.42
Ignition loss	.....	.....	0.43

Fritz Buechi made tests to determine the consequences of an unsuitable application of alumina cement in concrete, to chart the flexural strength, the tensile strength and the degree of adhesion to steel reinforcement of alumina cement of various proportions of mixture and various ages, and to find the reciprocal adhesiveness of concrete made with alumina cement and of concrete made with portland cement. In describing the results, he states that the test beam which he has employed may well replace the compression cube samples in conducting tests.

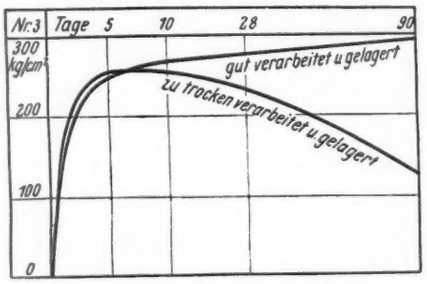


Fig. 1. Compression strength of cubes of good and of dry mix alumina cement over a period of 90 days; mixture, 200 kg. of cement to 1200 liters of concreting gravel. Upper curve, well worked and placed; lower curve, worked and placed too dry

Concrete prepared with alumina cement reaches its maximum hardness after 28 days. If the concrete is prepared too dry and is then not kept quite damp for at least several days, its strength is even somewhat higher than in properly mixed alumina cement concrete during the first few days, but it decreases considerably, so that after 90 days it may be only 40% of that after 5 days. It appears that interior forces become active and destroy the structure of the concrete. The 28-day test cannot be used, due to the rapidity of modern construction work, and not even the 7-day test. Although it is possible to obtain a comparative value of the quality of the concrete by use of the short-period test beams, this method cannot be applied to determine the compressive strengths, for the strength curves vary more or less according to the manner in which the cement is mixed, and the hardening process continues over many days. The tensile strength of alumina cement concrete is only about 7% more than that of portland cement concrete of the same mixing proportion; however, it is desirable for rapid construction work, as it reaches its maximum tensile strength in 24 hours.—*Beton u. Eisen*, 1928, Bd. XXVII, No. 9, pp. 174-178.

Alumina Cement. Henry Le Chatelier recently conducted several experiments in which he determined that the hardening of alumina cement depended upon the formation of monocalcium aluminate. He gives the following reaction for the hydration of cement:

$$2(CaO{\cdot}Al_2O_3) + 10H_2O = 2CaO{\cdot}Al_2O_3{\cdot}7H_2O + Al_2O_3{\cdot}3H_2O.$$

A discussion is also given on the chemical constitution, speed of reaction and crystallization.—*Materiaux de Construction et de Travaux Publics* (1927) 322.

Improvement in Shaft Kilns for the Manufacture of Lime, Gypsum, Calcareous and Aluminiferous Cements. A shaft kiln in which the raw materials in powdered form are introduced into the preheating or decarbonating zone in the upper part of the kiln and then descend into a sintering zone where they are burned or calcined. The average speed of the hot gases ascending through the sintering zone is approximately four times greater than that of the gases through the decarbonating zone, this being due to the latter zone having a greater diameter. When the more rapidly moving gases from the sintering zone enter the decarbonating zone they impinge eccentrically upon the slower and cooler gases, causing a downward draft on one side of the chamber which aids in forcing the preheated particles into the sintering zone.—*Geoffrey Martin, British Patent No.* 276,066 (1927).

The Maximum Density of Concrete for a Low Cement Content. Dr. Friesche assumes that the densest concrete possesses the greatest strength and experimented in obtaining mixtures of maximum density by aggregate grading methods. It is known that a mass of spherical bodies, of uniform size represent the greatest density when the voids between the spheres are occupied by equilateral triangles, the entire mass taking the shape of a tetrahedron. The remaining voids can easily be determined by calculation and filled with a second order of spherical particles whose size is determined by calculation to fit exactly into the voids. The remaining air space is filled with a third and smaller order of spheres and this process may be continued until a maximum density is reached. In general the introduction of spheres of the third order and at the most of the fourth order are as far as the operation is carried, as at this point the voids may be filled with the cement mixture. This method of determining the minimum amount of cementing material that can be used in concrete is called the "Friesechen rule," after its inventor.

It is apparent that a gravel mixture may be screened and regraded to meet the aggregate requirements as predetermined by the "Friesechen rule." Trial experiments using this system for grading produced high strengths. *Betonwerk* (1927) *No.* 40142.

Production of Portland Cement. The invention recently patented in Germany makes possible the utilization of the widely spread, natural occurring crystalline silicic acid for the production of portland cement. Sand in its natural state is mixed with the necessary amount of limestone to form calcium silicate. Small amounts (approximately 2%) of iron oxide, in the form of roasted pyrites and chromium oxide or copper oxide are added.

It is important that careful workmanship accompanies the preliminary operations with reference to the fine grinding and careful mixing of the raw materials. The cement produced in this manner is free from the easily attacked calcium aluminate and possesses considerable resistance against the chemical action of sulfur water, bog water, sea water, dilute acid solutions and the like. It develops excellent strength, particularly in regard to tensile strength.—*Dr. Serto Snyder, Utrecht, Holland. German Pat. No.* 457,116.

Standard Specifications for Gypsum Plaster in Russia. Prof. P. P. Budnikoff recently established the following gypsum standards as a result of tests made in the central research laboratories of the Ukrainian Silica Trust:

I. *Definition.* Hemihydrate (alabaster) is a product which through calcination between 120-170 deg. C. changes from natural gypsum ($CaSO_4 \cdot 2H_2O$) to hemihydrate ($CaSO_4 \cdot \frac{1}{2}H_2O$) and is ground either before or after burning.

II. *Technical Specifications.* (a) Loss on ignition not to exceed 7% nor to be less than 3%. (b) Specific gravity, 2.5 to 2.8. (c) Set not to begin before 1 min. Set beginning in less than 4 min. to be termed fast-setting and in more than 4 min., slow setting. (d) Set must be complete in less than 30 min. (e) Plaster of paris must pass completely through a Harzschen funnel. The portion retained on a 900-mesh sieve should not exceed 30%. (f) The loose liter weight (Harz funnel) may vary between 650-900 gr. (g) The normal water mass is calculated according to the formula $(1 - \frac{v}{1000d}).100\%$ in which v equals the liter weight and d the specific gravity. (h) The minimum tensile and compressive strengths, expressed in kg./cm.^{2} are as follows:

Time (days)	Tensile strength	Compressive Strength
4	6	30
7	10	40
28	16	70

(i) Plaster of paris to have a neutral reaction against phenolphthalein. (j) No specifications are given for the chemical composition.—*C. R. Platzmann.*

Protection of Fireproof Masonry. Water is sprayed between the inner and outer walls of the firing chamber which, however, entails a considerable loss of heat by conduction. The experimenter, M. Leellen also describes a method in which the fireproof material is impregnated with "Neutron," a colloidal graphite. After the first hour of burning, a glaze appears on the masonry in the form of a scale which may be knocked off and another coat of "Neutron" applied. This procedure is repeated until after the third time the stone is well impregnated and hardened. *Le Ciment,* (1928) 169-170.

Improvements in the Manufacture of Portland Cement in a Rotary Kiln. The inventor states that the output of clinker from a rotary kiln is proportional to the quantity of gases passing through the kiln in a given time and that consequently by increasing the linear speed with which the gases traverse the kiln, the clinker output is increased.

The process consists in increasing the velocity of the gases passing through the decarbonating zone of a rotary kiln. One method is to decrease the diameter of the zone in which the increased rate of flow is desired. The preferred form is to cause the gases to pass over baffles in the decarbonating zone which makes the gases describe a longer path than otherwise. The advantage of the baffle arrangement is that the gases give up their heat effectively to the raw material and at the same time internal radiation losses are prevented whereby an increased fuel economy is secured. *Geoffrey Martin, British Pat. No.* 282,868 (1927).

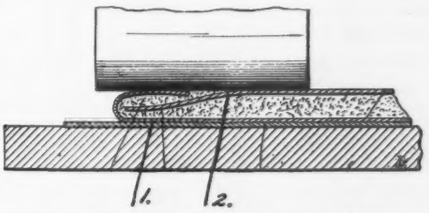
The Influence of Lead Oxide Upon the Hardening of Portland Cement. B. Garre describes first of all the various influences that destroy cement and concrete. A salt content of several per cent in the makeup water changes the characteristics of the cement not much in general; 10 to 50 g. of NaCl per liter has no strong influence, 0.1 to 0.25% sugar, 1 to 2% glucose and 2% tannic acid have but little influence. A 3% solution of calcium chloride increases the strength of concrete after 28 days of combined setting from 331 to 500 kg. per sq. cm. (4708 to 7112 lb. per sq. in.). Salts which react neutral can be used up to high percentages. Very surprising is the fact that an addition of 1/1000% of lead oxide influences cement very much in that a strong retardation of the setting process starts in. Increased additions retard the setting period still further. With a content of 1% of lead oxide only an exceedingly slight hardening sets in and under water there takes place a complete dissolution of the cement.—*Zeitschrift fuer angewandte und allgemeine Chemie* (1928), Vol. 169, pp. 305-308.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Superintendent of Documents, Government Printing Office, Washington, for each patent desired.

Paving Material and Method of Laying the Same. Two aqueous rubber solutions are prepared, one containing one or more vulcanizing ingredients and the other one or more complementary vulcanizing agents. Both solutions are inert when separate but vulcanize when mixed together. The method of surfacing pavement consists in mixing the two compositions on the foundation, causing vulcanization to take place *in situ.*—*Ernest Hopkinson, U. S. Patent No.* 1,661,828.

Art of Making Plaster Board. A quantity of plastic material is uniformly spread upon a cover sheet and covered with an opposite sheet. The margin of the lower sheet (1) is folded over the edges of the plaster core, being of sufficient length to envelop the entire edge. The other sheet (2) is



Showing how the sheets are folded and embedded in new method of making plaster board

pressed into the plaster core and imbedded as shown in the accompanying illustration, by the addition of more plastic material. The board surface is then smoothed out by means of a roller.—*Morgan K. Armstrong, assignor to United States Gypsum Co., U. S. Patent No.* Re. 16,860.

Cellular Silica Product and Method of Fabrication. A porous silica product, impervious to moisture and useful as a heat insulator. The method of treating the silica consists in converting it to a porous condition by heating it to 1700 deg. C. and allowing it to cool to either alpha cristobalite or tridymite, both of a porous structure. The treated silica is then impregnated with an organic binder and the material heated to a fusion temperature, which is about 1750 deg. C.—*Harold L. Watson, assignor to General Electric Co., U. S. Patent No.* 1,669,363.

Method and Means for the Preparation of Plaster Prior to Using. The method permits the preservation of plaster for several hours after it is mixed, without the addition of any other material. The plaster is heated in a double-walled container to a temperature ranging from 60 deg. C. to 100 deg. C. by a water containing material circulating between the walls of the chamber. Water, pre-heated to approximately the same temperature, and the hot plaster, are then mixed on another double-walled chamber, kept above 60 deg. C. in a likewise manner. The gaged plaster may be preserved in this chamber for 5 to 6 hours before using. The material is pumped out by a standard apparatus so constructed as to prevent cooling below 60 deg. C. of the plaster while in the conduit and nozzle. *Louis Emile Chassevent, U. S. Pat. No.* 1,672,638.

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone flux Week ended June 16	Limestone flux Week ended June 23	Sand, stone and gravel Week ended June 16	Sand, stone and gravel Week ended June 23
Eastern	3,594	3,283	15,514	15,321
Allegheny	3,615	3,355	10,208	9,568
Pocahontas	665	756	860	752
Southern	599	559	12,600	13,000
Northwestern	2,237	2,052	11,527	10,795
Central Western	413	409	13,592	13,688
Southwestern	430	419	6,524	7,145
Total	11,553	10,833	70,825	70,269

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1927 AND 1928

District	Limestone Flux 1927 Period to Date June 25	Limestone Flux 1928 Period to Date June 23	Sand, Gravel and Stone 1927 Period to Date June 25	Sand, Gravel and Stone 1928 Period to Date June 23
Eastern	75,706	62,769	179,835	173,038
Allegheny	85,689	76,775	155,568	134,642
Pocahontas	10,507	9,546	18,091	17,881
Southern	13,346	13,819	280,739	249,870
Northwestern	32,935	26,709	135,355	121,332
Cent. Western	12,266	9,968	198,708	212,683
Southwestern	7,608	10,283	125,434	134,118
Total	238,057	209,869	1,093,730	1,043,564

COMPARATIVE TOTAL LOADINGS, 1927 AND 1928

	1927	1928
Sand, stone, gravel	*1,093,730*	*1,043,564*
Limestone flux	*238,057*	*209,869*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning July 14:

SOUTHERN FREIGHT ASSOCIATION DOCKET

40806. **Sand and gravel,** from Johnsonville, Tenn., to Trenton, Tenn. Present rates: Sand, carloads, 160c; gravel, carloads, 147c per net ton. Proposed rate, on sand and gravel, carloads (See Note 3), from Johnsonville, Tenn., to Trenton, Tenn. (applicable on intrastate traffic), 115c per net ton, made on basis used recently in revising rates from, to and between points in the Southeast.

40859. **Sand,** from Talbird and West End, N. C., to Wolf Creek, Del Rio, Bridgeport, Erwin and Unicoi, Tenn. It is proposed to establish the following reduced rates on sand (other than molding sand), carloads, minimum weight 100,000 lb. (when 90% of marked capacity of car is less than 100,000 lb., such 90% of marked capacity will apply as minimum), except when loaded to full visible capacity the actual weight will govern, from West End and Talbird, N. C., to Wolf Creek, Del Rio and Bridgeport, Tenn., 180c; Erwin, Tenn., 188c, and to Unicoi, Tenn., 193c per net ton.

40899. **Sand** from Talbird, N. C., to Norfolk, Va. Present rate, 205c per ton (combination). Proposed rate on—Sand, carloads, minimum weight 100,000 lb. (when 90% of marked capacity is less than 100,000 lb., such 90% or marked capacity will apply as minimum), except when loaded to full visible capacity, the actual weight will govern, from Talbird, N. C., to Norfolk, Va., 160c per net ton, same as rate in effect from West End and Aberdeen, N. C.

40908. **Limestone, marble or marl, ground,** etc., from Knoxville, Mascot and Strawberry Plains, Tenn., to Savannah, Ga., and Charleston, S. C. Present rate, 198c. Proposed rate on—Limestone, marble or marl, ground or pulverized, carloads, minimum weight 67,000 lb., except where marked capacity is less, in which event marked capacity of the car will be the minimum, from and to points mentioned, 210c per net ton, made not less than the rate in effect from Bolivar, Fairmount and Whitestone, Ga., to Savannah, Ga.
nah, Ga.

Note 1—Minimum weight marked capacity of car.
Note 2—Minimum weight 90% of marked capacity of car.
Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

SOUTHWESTERN FREIGHT BUREAU DOCKET

15177. **Molding sand,** from Silica, Mo., to Atchison, Kan. To establish a rate of 11c per 100 lb. on molding sand, carloads. Minimum weight, 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity the actual weight will apply. In no case shall the minimum weight be less than 40,000 lb. from Silica, Mo., to Atchison, Kan.

Shippers state that the present rate, which is combination of locals, is prohibitive.

15244. **Sand and gravel,** from Texas points to points in Oklahoma. To establish following distance scale of rates in cents per 100 lb. on sand and gravel, carloads (See Note 1), except where cars are loaded to actual visible loading capacity, actual weight shall govern, but not less than 50,000 lb., from F. W. & D. C. Ry. stations, Cliffside to Twist, inclusive, Index Nos. 1315 to 1365, inclusive, of S. W. L. Tariff No. 26Y; also, C. R. I. & G. stations, Texhoma, Texas, to Dalhart, Texas, inclusive, Index Nos. 620 to 650, inclusive, to C. R. I. & P. Ry. stations in Oklahoma north of Texhoma, Tyrone to Texhoma, inclusive, Index Nos. 31670 to 31695, inclusive, of S. W. L. Tariff 26Y.

	Rate
60 miles and under	6
90 miles and over 60 miles	7
120 miles and over 90 miles	8
160 miles and over 120 miles	9
210 miles and over 160 miles	10
260 miles and over 210 miles	11

Shippers request that the same scale of rates be established to points on the C. R. I. & P. Ry. north of Texhoma, Texas, as recently established from points on the Ft. W. & D. C. Ry. north of Amarillo, Texas, to points on the C. R. I. & P. Ry. in western Oklahoma.

15256. **Crushed stone,** from Whitestone, Ga., to Kansas City, Mo. To establish rate of $5.30 per ton of 2000 lb. on crushed stone, carloads, from Whitestone, Ga., to Kansas City, Mo. The proposed rate, it is stated, is that which obtains on basis of Memphis combination.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

14872. **Rubble** or **stone,** waste, carloads (See Note 3), from Millstone, Conn., to New London, Conn., 50c (to meet water competition, and to expire when job is completed).

14909. **Stone, broken, crushed,** in bulk in gondola or other open-top cars, carloads (See Note 3), from Westfield, Mass., to Mt. Hermon, Mass., $1.25 per net ton, via Northampton, Mass., B. & M. R. R. Reason—To provide same rate as is now in effect to Bernardston, Mass.

14948. **Sand and gravel,** common, carloads (See Note 3), from Manchester and Westboro, N. H., to stations on the Central Vermont Ry. and Rutland R. R., rates on the same basis as those now effective from East Weare, N. H., published in B. & M. R. R. I. C. C. A2598. (Exhibit showing destination points and rates will be furnished upon request.) Reason—To accord shippers at Manchester and Westboro, N. H., rates on a comparable basis with shippers located at East Weare, N. H.

CENTRAL FREIGHT ASSOCIATION DOCKET

18851. To establish on **crushed stone,** carloads, Whitehouse, Ohio, rate of 80c per net ton to Delta, Ohio, and 85c per net ton to Wauseon, Ohio. Present rate—90c per net ton. Route—Via Wabash Ry. and T. & I. R. R.

18860. To establish on **agricultural limestone,** carloads, minimum weight 50,000 lb., Hillsville, Penn., to Wyside, Penn., rate of 12½c. Route—Via P. & L. E. R. R. Homestead Transfer, Penn., and P. R. R. Present rate—Sixth class.

18863. To establish following commodity rates on **ground silica,** carloads (See Note 2), but not less than 72,000 lb., Olive Branch, Ill., to points east of the Western Termini of Eastern Trunk Lines. Present and proposed rates (per net ton):

To—	*Present	Proposed
Albany, N. Y.	763	500
Baltimore, Md.	735	480
Belington, W. Va.	636	425
Boston, Mass.	835	540
Cumberland, Md.	636	425
Hagerstown, Md.	735	480
New York, N. Y.	795	520
Norfolk, Va.	735	480
Philadelphia, Penn.	755	490
Rochester, N. Y.	735	480
Rockland, Maine	835	540
Syracuse, N. Y.	735	480
Utica, N. Y.	735	480

*Subject to a minimum weight of 40,000 lb.

18866. To establish on **sand (blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica),** carloads, from Chicago, Ill., to Midland, Mich., rate of 276c per net ton. Present rate, 24½c.

18867. To establish on **crushed stone,** carloads, East Liberty, Ohio, to points in Ohio, rates as shown below. Present and proposed rates (in cents per net ton):

To—	Prop.	Pres.	Route
Carey, Ohio	90	Class	*
Harpster, Ohio	105	Class	†
Jamestown, Ohio	105	Class	‡
Hyatts, Ohio	90	Class	†

*Via N. Y. C. R. R., Bellefontaine and C. C. C. & St. L.
†Via N. Y. C. R. R., Columbus and H. V.
‡Via N. Y. C. R. R., Wapakoneta and B. & O.

18868. To establish on **crushed stone,** carloads, from Holland, Ohio, to Lime City and Dowling, Ohio, rate of 65c per 2000 lb. Present rate—80c per 2000 lb.

18870. To establish on **sand, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica,** carloads, from South Bend, Ind., to points in Indiana and Illinois, rates as shown below. Present and proposed rates (in cents per net ton):

To—	Prop.	Pres.
E. Gary, Ind. (N. Y. C.-M. C.	90	Class
Chicago, Ill. (N. Y. C.)	101	Class

18873. To establish on **crushed stone,** carloads, Thrifton, Ohio, to Ohio, rates as shown below:

To—	*Prop. rate	†Pres. rate	To—	*Prop. rate	†Pres. rate
Pleasant Ridge	100	14	Kitchener	105	14
Kennedy Hts.	100	14	Venable	105	14
Silverton	100	14	Edgewood	105	14
Deer Park	100	14	Lytle	105	14
Beechwood	100	14	Manor	105	14
Rossmoyne	100	14	Centerville	105	14
Terra Alta	100	14	Oakridge	115	14
Blue Ash	100	14	Hempstead	115	13½
Hazelwood	100	14	Montgomery	100	14
Brecon	100	14	Middletown	105	15
Miltomson	100	14	Armico	105	15
Mason	100	14	Oakland	105	15
Hageman	100	13½	Union Village	100	15
Turtle Creek	100	14	Glenwood	100	15
Lebanon	100	14	Bowyer	100	13½
Lelan	105	14	Middletown Jc.	100	13½
Dodds	105	14			

Present rates—Sixth class.
*In cents per net ton.
†In cents, 100 lb.

18876. To establish on **sand and gravel**, other than blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, from Bellaire, Ohio, Bridgeport, Ohio, Martins Ferry, Ohio, Moundsville, W. Va., Wheeling, W. Va., Dille, Ohio, Follansbee, W. Va. (See Note B), to Ohio, Pennsylvania and West Virginia interstate, West Virginia intrastate (See Note A).

Note A—Only deals with West Virginia intrastate traffic from Follansbee, W. Va.

Note B—Will apply on Ohio interstate and West Virginia intrastate movements.

Commodity rates on basis of the following mileage scale:

	Rate, cts. per ton of 2000 lb.
20 miles and over	60
40 miles and over 20 miles	70
60 miles and over 40 miles	80
80 miles and over 60 miles	90
100 miles and over 20 miles	100
125 miles and over 100 miles	110
150 miles and over 125 miles	120
175 miles and over 150 miles	130
200 miles and over 175 miles	140

20c per ton of 2000 lb. to be added for joint hauls.

In computing distances under this scale the shortest routes via existing connections for the interchange of carload traffic shall be used embracing as a maximum the lines of not more than three line haul carriers. Representatives rates (in cents per 2000 lb.):

From—	Miles	Pres.	Prop.
Wheeling, W. Va., to Steubenville, Ohio	24	70	70
Wheeling, W. Va., to Uhrichsville, Ohio	66	125	90
Moundsville, W. Va., to Washington, Penn.	43	90	80
Bridgeport, Ohio, to Cambridge, Ohio	57	90	80

18939. To establish rates on **crushed stone**, carloads, from Lima, Ohio, to the following points, rate per net ton: Akron, 100c; Ashland, 90c; Barberton, 100c; Galion, 80c; Kent, 110c; Mansfield, 80c; Marion, 70c; Youngstown, 160c. Present rates, sixth class.

18955. To establish on **crushed stone, crushed stone screenings**, carloads, from Bluffton, Ohio, to Dayton, Ohio, rate of 90c per net ton. Present rate, sixth class. Route, via N. Y. C. & St. L. R. R., Lima, Ohio, and B. & O. R. R.

18957. To establish on **agricultural limestone**, carloads, minimum weight 25 net tons, from Marble Cliff, Ohio, to Lathrop, Ohio, via Federal Valley R. R., rate of 130c per net ton. Route—Penna. R. R., Columbus, Ohio, Palos, Ohio, Federal Valley R. R. Present rate, 280c per net ton.

18959. To establish on **molding sand**, carloads, from Delphi, Ohio, to Plano, Ill., rate of 317c per net ton. Present rate, 328c per net ton.

18828. To establish on **sand and gravel**, carloads, Burr Oak, Ind., to points in Illinois and Indiana, rates as shown in Exhibit "B" attached.

EXHIBIT "B"

From Burr Oak, Ind.

To—	Miles	Pres. Rate	Prop. Rate
N. Y. C. Stas.			
Stoutsburg, Ind.	38.4	*	80
Forest City, Ind.	46.9	*	85
Schneider, Ind.	55.9	*	90
Momence, Ill.	67.4	*	95
Kankakee, Ill.	78.7	*	100
Highlands, Ind.	63.4	*	90
St. John, Ind.	71.1	*	100
Cook, Ind.	69.0	*	95
Belshaw, Ind.	60.4	*	95
C. A. & S. Stas.			
Wilders, Ind.	32.0	*	85
Kniman, Ind.	47.4	*	85
Kent, Ind.	59.8	*	90
Julian, Ind.	68.1	*	95
Goodland, Ind.	77.1	*	100
Swanington, Ind.	89.9	*	105
Oxford, Ind.	94.8	*	110
Weishars, Ind.	77.0	*	100
Morocco, Ind.	87.6	*	105
G. T. Stas.			
Union Mills, Ind.	48.4	*	85
Haskells, Ind.	54.7	*	90
Sedley, Ind.	68.2	*	95
Lottaville, Ind.	79.0	*	100
Maynard, Ind.	87.1	*	105
Harvey, Ind.	95.6	*	110
C. S. S. & S. B. Stas.			
Tremont, Ind.	66.5	*	95
Miller, Ind.	78.8	*	100

*Sixth class.

18834. To establish on **crushed stone**, carloads, Putnamville, Ind., to Cannelton, Ind., rate of 113c per net ton. Route: C. I. & L. Ry. to French Lick Springs, Ind., Southern Ry. beyond. Present rate, sixth class.

18837. To establish on **crushed stone**, carloads, Findlay, Ohio, to Pontiac, Mich., rate of 125c per net ton. Route: N. Y. C. R. R., Toledo, D. & T. S. L. R. R. or N. Y. C. R. R., Detroit, Mich., Gt. Ry. Present rate, sixth class.

18839. To establish on **crushed stone**, carloads, Spore, Ohio, to Ohio points rates as shown below. Present and proposed rates: From Spore, Ohio, in cents per net ton.

	Prop. rate	Pres. rate
Fair Oaks	105	*
Sealover	105	*
Philo	115	*
Oil Spring	115	*
Malta	125	*
Roxbury	125	*
Relief	125	*
Waterford (Beverly)	135	*
Marietta	135	*

*Class N. Y. C. R. R.

TRUNK LINE ASSOCIATION DOCKET

19121. **Crushed stone**, carloads (See Note 2), from White Haven, Penn., to Montrose, Penn., *$1.25 per net ton. *It will be necessary to reduce from White Haven to Woodburne, Penn., South Montrose and from Hendler, Penn., to South Montrose and Montrose, respectively, account of being intermediate. Reason—Proposed rate compares favorably with rate on like commodities from and to points in same general territory.

19123. **Sand**, other than blast, engine, fire, foundry, molding and silica and **gravel**, carloads (See Note 2), from Attica, N. Y., to East Bergen, N. Y., 83c per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force from Akron and Clarence, N. Y., to East Bergen, N. Y.

19125. **Sand**, other than blast, engine, foundry, molding, glass, silica, quartz or silex, carloads (See Note 2), from Morrisville and Tulleytown, Penn., to Bear, Del., $1.25 per ton of 2000 lb. Reason—Proposed rate is comparable with rates now in force from Morrisville, Tullytown, Penn., to Atlantic City, N. J., and from Morrisville, Penn., to New Castle, Del., etc.

9134. **Sand** (other than blast, engine, glass, foundry, molding, sea or silica), carloads (See Note 2), from Farmingdale, N. J., and South Lakewood, N. J., to stations on Raritan River R. R., 92c per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force on like commodities to Plainfield, N. J., and Easton, Penn.

19136. **Sand and gravel**, carloads (See Note 2), from Oaks Corners, N. Y., to Lehigh Valley R. R. stations; Towanda, Sayre, Willard, DeRuyter, Auburn, Ithaca Junction, etc., rates ranging from 75c to $1.25 per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force on crushed stone from and to same points.

19147. To cancel the rate of $1.60 per net ton on **sand**, N. O. I. B. N. (other than blast, engine, foundry, molding and silica) and **gravel**, and the rate of $1.80 per net ton on **sand, blast, engine, foundry, glass, molding and silica**, carloads (See Note 2), from Tioga, Penn., to Towanda and Monroeton, Penn. Classification basis to apply. Reason—Investigation develops that there has been no traffic for some time, nor is there prospects of future movements, therefore rates are obsolete.

M960. To restrict all commodity rates on **sand**, carloads, from Buffalo district to points in New York state, other than Rochester, to apply on intrastate and ex-lake traffic.

19167. **Gravel, sand and broken stone**, carloads, minimum weight 40,000 lb., from Blissville Docks, N. Y., to stations on Long Island R. R.-Jamaica, Queens Village, Glendale, St. Albans, Rosedale, East New York, Atkins, Ozone Park, Howard Beach and various, 85c per ton of 2000 lb. Reason—To meet joint water and truck competition.

M958. **Sand, blast, engine, fire, foundry, glass, molding and silica**, carloads (See Note 2), from Buffalo, N. Y., to points on New York Central R. R., Albany, Amsterdam, Beacon, Canton, Carthage, Cohoes, Frankfort, Malone, Mt. Vernon, New York, Ogdensburg, Troy, Watertown, Clyde, Fulton, Phelps, Syracuse, N. Y., and Williamsport, Penn., and various, rates ranging from $1.10 to $3.10 per ton of 2000 lb. Reason—Proposed rates are comparable with rates on like commodities from and to points in same general territory.

19174. **Sand** (other than blast, engine, glass, foundry, molding, sea or silica) and **gravel**, carloads (See Note 2), from Palmerton, Penn., to Pleasant Mount, Penn., $1.50 per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force from Palmerton and Lehigh Gap, Penn., to Carbondale, Penn.

19184. **Crushed stone**, carloads (See Note 2), from Barree, Union Furnace, Tyrone Forge and Stover, Penn., to Heshbon, Penn., $1.25 per ton of 2000 lb. Reason—Proposed rates are comparable with rates now in force on like commodities from and to points in the same general territory.

19185. To cancel commodity rate of 99c per ton of 2000 lb. on **molding sand**, carloads, applying from Bangor, Penn., to Tamaqua, Penn. Classification basis to apply. Reason—Investigation develops that shipments have now been completed and there is no further use for rate, therefore sam is obsolete.

WESTERN TRUNK LINE DOCKET

5273. Rate: **Stone, crusher**, carloads (See Note 2), but not less than 40,000 lb., from Rapid City, S. D., to Crawford, Neb. Present, 10c per 100 lb.; proposed, 7c per 100 lb.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4550. **Crushed stone**, carloads, minimum weight marked capacity, from Shelterville, Ill., to Enfield, Ill., via Ashley and L. & N. R. R. Present, class rate; proposed, $1.40 per net ton.

4553. **Crushed stone**, carloads (See Note 1), rates in cents per net ton.

	From— Lehigh		Thornton	
To—	Pres.	Pro.	Pres.	Pro.
Urbana, Ill.	105	80	119	93

4553, Sub. 1. It is proposed to cancel present rates on **crushed stone**, carloads, from Lehigh and Thornton, Ill., via I. C. R. R. to stations on the I. C. Elec. Ry., Penna. R. R. and Southern Ry., account no movement.

4554. **Sand (lake, river and bank**, other than sand loam), carloads, from Miller and Willow Creek, Ind., to Downers Grove, Ill. Rates in cents per net ton. Present, 139c; proposed, 100c.

4257, Sub. 1. **Sand, core** (See Note 3), from Greenwich, Kankakee, Van Siding and West Kankakee, Ill., to Danville, Ill. Present, $2.30 per net ton; proposed, $1.64 per net ton.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4561. **Sand and gravel**, carloads (See Note 3), but not less than 40,000 lb., from Yorkville, Ill., to LaSalle, Peru and Oglesby, Ill. Present, 80c; proposed, 76c.

4519A. **Sand** (except blast, core, engine, filter, fire or furnace, etc.), carloads (See Note 3), but not less than 40,000 lb., from Decatur, Ill., to Springfield, Ill. Rates in cents per net ton. Present, none in effect; proposed, 80c.

4564. **Sand and gravel**, carloads (See Note 3), from Clinton, Ill. (Clinton Sand and Gravel Co.'s pit), to Penn. R. R. stations—Prairie Hall to Borton, Ill. Rates in cents per net ton. Present, no through rates in effect.

To Illinois pts.	Prop.	To Illinois pts.	Prop.
Prairie Hall	101	Kemp	113
Lovington	101	Oakland	113
Arthur	113	Isabel	126
Chestervale	113	Borton	126

Hearing on Rail Rates on Lime in Virginia to Be Held in August

THE petition of the railroads operating in Virginia for permission to make effective for intrastate shipments the same schedule of rates on all kinds of lime approved by the Interstate Commerce Commission for single and joint line application between southern points was set for hearing August 16 by the state corporation commissioner recently.

The interstate rates which the carriers propose applying to shipments within Virginia on all lime, whether it is to be used for building, chemical or agricultural purposes, would result in some increases and some decreases in the present Virginia intrastate rates for carload shipments. Their application within Virginia would also cancel all present Virginia intrastate commodity and point to point rates on lime, and would increase the carload minimum weight, thereby materially affecting both the builders and the farmers of the state.

While the scales shown in the railroads' petition are intended for application over the so-called trunk lines, it is assumed that the so-called short or weak lines will indicate at the hearing some basis of rates which should be applied to and from points on these lines for both single and joint line hauls.—*Richmond* (Va.) *Dispatch.*

Portland Cement Production in June

Shipments Show Considerable Decrease from June, 1927—Also Slight Decrease from Previous Month

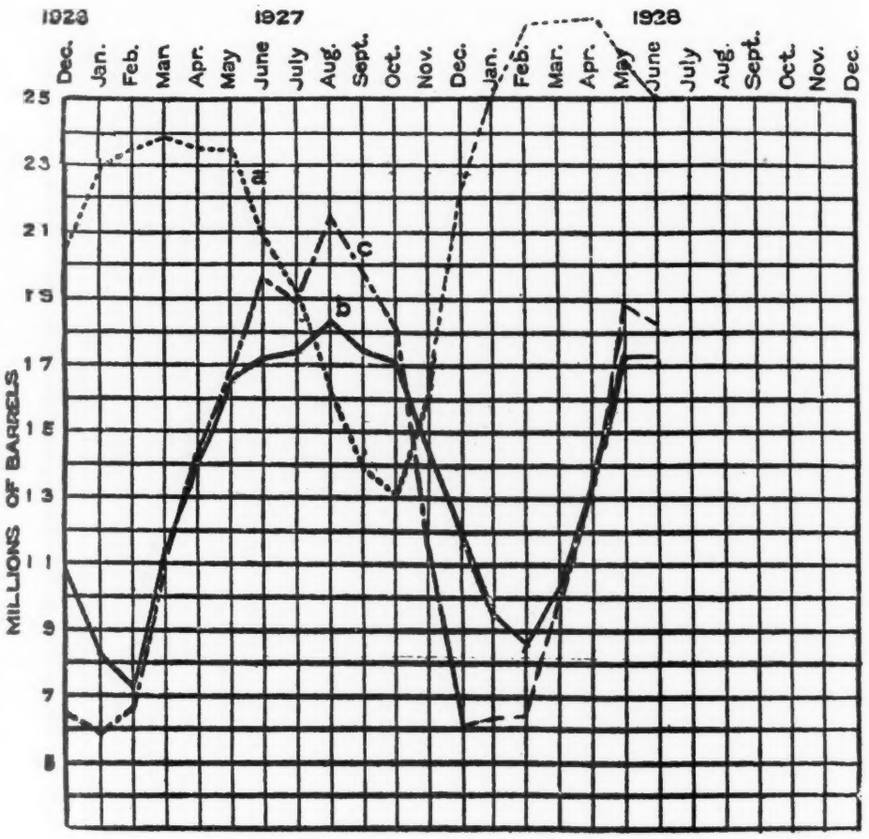
THE portland cement industry, in June, 1928, produced 17,469,000 bbl., shipped 18,421,000 bbl. from the mills, and had in stock at the end of the month 25,021,000 bbl., according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in June, 1928, showed an increase of 1.4% and shipments a decrease of 6.8%, as compared with June, 1927. Portland cement stocks at the mills were 19.3% higher than a year ago. The total production for the first half of 1928 amounts to 77,005,000 bbl., compared with 75,058,000 bbl. in the same period of 1927, and the total shipments for the first half of 1928 amount to 73,953,000 bbl., compared with 74,775,000 bbl. in the same 1927 period.

The statistics here presented are compiled from reports for June for all manufacturing plants except two, for which estimates have been included in lieu of actual returns. They include the output of another new plant, lo- include the output of another new plant in Tennessee, which began operating in June.

In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 158 plants at the close of June, 1928, and of 148 plants June, 1927.

RELATION OF PRODUCTION TO CAPACITY

	June Pct. 1928	June Pct. 1927	May Pct. 1928	Apr. Pct. 1928	Mar. Pct. 1928
Month	90.1	93.1	86.6	70.0	51.7
12 mo. ended	73.8	74.3	73.9	74.0	74.6



(a) Stocks of finished portland cement at factories; (b) Production of finished portland cement; (c) Shipments of finished portland cement from factories

PRODUCTION AND STOCKS OF CLINKER, BY MONTHS, IN 1927 AND 1928, IN BARRELS

Month	Production 1927	Production 1928	Stocks end of month 1927	Stocks end of month 1928	Month	Production 1927	Production 1928	Stocks end of month 1927	Stocks end of month 1928
January	10,410,000	11,839,000	9,989,000	9,672,000	July	15,697,000		9,609,000	
February	9,253,000	11,363,000	11,943,000	12,237,000	August	16,396,000		7,887,000	
March	12,397,000	12,501,000	12,997,000	14,463,000	September	15,931,000		6,490,000	
April	14,246,000	13,844,000	13,335,000	15,002,000	October	16,469,000		5,960,000	
May	15,677,000	16,025,000	12,514,000	*14,320,000	November	14,698,000		6,374,000	
June	15,437,000	15,941,000	10,926,000	12,936,000	December	13,177,000		7,660,000	

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN APRIL AND MAY, 1927 AND 1928, IN BARRELS*

Shipped to—	1927—April	1928	1927—May	1928	Shipped to—	1927—April	1928	1927—May	1928
	14,350,000	13,307,000	16,865,000	18,986,000					
Alabama	173,893	233,865	164,359	294,946	New Jersey	897,645	778,746	894,457	899,439
Alaska	1,037	542	2,514	588	New Mexico	28,566	27,664	31,149	30,612
Arizona	47,573	64,808	46,724	23,982	New York	2,131,528	1,758,888	2,188,026	2,414,892
Arkansas	53,331	86,513	77,207	120,605	North Carolina	324,758	199,340	367,215	259,658
California	1,137,845	1,058,739	1,281,461	1,101,338	North Dakota	38,157	34,627	40,034	69,986
Colorado	86,431	90,312	109,671	122,205	Ohio	837,050	776,992	966,808	1,263,450
Connecticut	179,863	187,697	193,315	273,367	Oklahoma	242,747	209,850	309,509	307,249
Delaware	40,699	26,177	35,564	35,361	Oregon	122,281	102,480	152,050	143,000
District of Columbia	89,048	66,108	79,566	66,508	Pennsylvania	1,199,544	928,060	1,331,265	1,396,046
Florida	271,575	134,647	234,914	90,435	Porto Rico	1,000	0	2,250	500
Georgia	168,681	155,787	209,126	167,422	Rhode Island	78,743	81,029	77,876	93,304
Hawaii	25,876	19,314	25,631	29,807	South Carolina	82,680	101,838	87,442	141,083
Idaho	32,063	30,832	26,767	35,009	South Dakota	35,465	42,599	38,442	65,137
Illinois	956,012	1,192,251	1,402,964	2,087,924	Tennessee	180,574	216,928	217,416	274,229
Indiana	418,874	355,434	561,019	568,668	Texas	472,879	526,063	545,848	601,278
Iowa	211,248	405,654	357,184	929,356	Utah	31,793	36,932	32,759	38,520
Kansas	203,368	202,705	294,596	250,076	Vermont	30,185	27,791	29,715	43,912
Kentucky	148,567	130,168	188,319	178,020	Virginia	135,226	175,192	168,463	201,315
Louisiana	107,023	112,667	116,352	110,257	Washington	248,518	237,749	223,574	315,209
Maine	39,031	30,015	49,870	49,458	West Virginia	112,009	103,682	141,521	151,015
Maryland	224,405	176,807	224,398	250,926	Wisconsin	356,961	287,693	568,828	615,376
Massachusetts	293,606	256,150	289,218	306,685	Wyoming	14,783	15,229	17,531	18,033
Michigan	857,574	710,731	1,258,924	1,218,783	Unspecified	102,398	41,739	†46,626	27,702
Minnesota	258,506	185,901	381,814	446,443		14,296,532	13,265,051	†16,806,584	18,932,459
Mississippi	78,127	73,651	74,061	89,421	Foreign countries	53,468	41,949	58,416	53,541
Missouri	312,311	383,704	409,889	473,066					
Montana	23,882	32,676	24,561	50,054	Total shipped from cement plants	14,350,000	13,307,000	16,865,000	18,986,000
Nebraska	96,255	108,224	155,964	131,720					
Nevada	10,406	7,195	7,495	11,050					
New Hampshire	43,932	34,667	38,333	48,034					

*Includes estimated distribution of shipments from three plants each month.
†Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN JUNE, 1927 AND 1928, AND STOCKS IN MAY, 1928, IN BARRELS

District	Production 1927—June—1928		Shipments 1927—June—1928		Stocks at end of month 1927	1928	Stocks at end of May, 1928*
E'n Penn., N. J. & Md.	4,091,000	4,056,000	4,745,000	4,081,000	4,394,000	6,129,000	6,153,000
New York and Maine†	1,148,000	1,208,000	1,307,000	1,264,000	1,536,000	1,843,000	1,899,000
Ohio, W'n Penn. & W. Va.	1,716,000	1,711,000	2,162,000	1,759,000	2,953,000	3,434,000	3,482,000
Michigan	1,580,000	1,456,000	1,804,000	1,731,000	1,971,000	1,964,000	2,240,000
Wis., Ill., Ind. & Ky.	2,387,000	2,436,000	3,086,000	2,443,000	2,432,000	3,004,000	3,011,000
Va., Tenn., Ala., Ga., Fla. & La.	1,414,000	1,391,000	1,357,000	1,409,000	1,206,000	1,858,000	1,876,000
E'n Mo., Ia., Minn. & S. D.	1,467,000	1,715,000	1,927,000	2,109,000	2,841,000	3,131,000	3,524,000
W'n Mo., Neb., Kan. & Okla.	994,000	1,055,000	976,000	1,058,000	1,743,000	1,570,000	1,573,000
Texas	469,000	540,000	454,000	573,000	330,000	356,000	389,000
Colo., Mont. & Utah	268,000	275,000	233,000	299,000	541,000	486,000	510,000
California	1,322,000	1,206,000	1,294,000	1,255,000	601,000	820,000	869,000
†Oregon & Washington	368,000	420,000	416,000	440,000	424,000	426,000	446,000
	17,224,000	17,469,000	19,761,000	18,421,000	20,972,000	25,021,000	25,972,000

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1927 AND 1928, IN BARRELS

Month	Production 1927	1928	Shipments 1927	1928	Stocks at end of month 1927	1928
January	8,258,000	9,768,000	5,968,000	6,541,000	22,914,000	25,116,000
February	7,377,000	8,797,000	6,731,000	6,563,000	23,563,000	27,349,000
March	11,450,000	10,223,000	11,100,000	10,135,000	23,922,000	27,445,000
April	14,048,000	13,468,000	14,350,000	13,307,000	23,654,000	27,627,000
May	16,701,000	17,280,000	16,865,000	18,986,000	23,503,000	*25,972,000
June	17,224,000	17,469,000	19,761,000	18,421,000	20,972,000	25,021,000
July	17,408,000		18,984,000		19,397,000	
August	18,315,000		21,411,000		16,292,000	
September	17,505,000		19,828,000		13,996,000	
October	17,174,000		18,105,000		13,141,000	
November	14,449,000		11,619,000		16,022,000	
December	11,999,000		6,200,000		22,082,000	
	171,908,000		170,922,000			

*Revised.

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN JUNE, 1927 AND 1928 (IN BARRELS)

District	1927—Production—1928		1927 Stock at end of month	1928 Stock at end of month
Eastern Pennsylvania, New Jersey and Maryland	3,692,000	3,665,000	1,407,000	1,941,000
New York and Maine*	1,070,000	1,152,000	505,000	995,000
Ohio, Western Pennsylvania and Maryland	1,528,000	1,727,000	1,422,000	1,938,000
Michigan	1,286,000	1,270,000	1,383,000	1,699,000
Wisconsin, Illinois, Indiana and Kentucky	1,988,000	1,916,000	1,406,000	1,506,000
Virginia, Tenn., Alabama, Georgia, Florida, Louisiana	1,363,000	1,366,000	870,000	948,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,344,000	1,584,000	732,000	900,000
Western Missouri, Nebraska, Kansas and Oklahoma	896,000	1,031,000	554,000	563,000
Texas	472,000	479,000	177,000	94,000
Colorado, Montana and Utah	147,000	256,000	639,000	402,000
California	1,343,000	1,137,000	1,233,000	1,373,000
Oregon and Washington	308,000	358,000	598,000	577,000
	15,437,000	15,941,000	10,926,000	12,936,000

*Maine began producing April, 1928, and shipping May, 1928.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN MAY, 1928

Exported to—	Barrels	Value
Canada	4,821	$27,604
Central America	4,716	13,952
Cuba	27,105	50,757
Other West Indies	1,762	4,702
Mexico	7,222	22,655
South America	15,732	65,859
Other countries	8,815	50,476
	70,173	$236,005

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN MAY, 1928

	Barrels	Value
Alaska	1,880	$ 5,595
Hawaii	19,813	44,862
Porto Rico	2,080	5,333
	23,773	$55,790

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES, AND BY DISTRICTS, IN MAY, 1928

Imported from	District into which imported	Barrels	Value
Belgium	Galveston	1,847	$ 2,403
	Hawaii	9,040	11,393
	Massachusetts	59,782	75,013
	New Orleans	3	5
	New York	19,700	30,545
	Oregon	13,000	16,356
	Philadelphia	25,248	36,914
	South Carolina	25,000	30,968
	Washington	12,717	15,816
	Total	166,337	$219,413
Canada	Maine & N. H.	1,500	$ 3,044
Denmark	Porto Rico	17,053	$ 22,956
France	New York	1,341	$ 3,005
Germany	Los Angeles	1,001	$ 2,449
	New York	3	14
	Total	1.004	$ 2,463
United K'd'm	New York	2,524	$ 5,028
	Philadelphia	750	963
	Total	3,274	$ 5,991
	Grand total	190,509	$256,872

Philadelphia Bans Foreign Portland Cement

PHILADELPHIA, Penn., newspapers from June 29 on have devoted considerable space to what is termed by the *Public Ledger* a "cement war." The resolution was adopted on June 28 by the city council barring the use of foreign or imported building materials in all city (public) work.

Councilman Edwin R. Cox, introducing the resolution, said Philadelphia, as the "workshop of the world" and the bulwark of American industry, should use only American-made goods in its public work. The recent invasion of foreign-made products, he said, vitally affected home industries.

The action came about through efforts made to commit the city to the use of Belgian cement. Labor organizations opposed the movement, contending the loss to cement workers by the use of foreign material would run into millions.

On July 5, George M. Richardson, vice-president of the Philadelphia Export Co., asserting that the ban on foreign cement will virtually put his concern out of business, announced that David T. Smythe, former city solicitor, had been directed, as counsel for the company, to begin action to set aside the ban.

"The action of the city in excluding Belgian cement is discriminatory, unfair and unjust," said Mr. Richardson. "It is unfair to the taxpayers of the city and an affront to the ambassadors of foreign countries.

"We are port builders and not port destroyers. We are exporters as well as importers of grain and coal and other products as well as cement. We employ Philadelphia labor and union labor at that. We are tenants of city piers and pay rentals to the city.

"By its action in banning Belgian cement the city builds a wall against a friendly country trying to do business with the United States."

On July 6, David J. Smythe, former city solicitor, acting as counsel for the Philadelphia Export Co., in a letter to Director Murdoch, of the City Department of Public Works, gave notice that a taxpayers' suit would be filed to restrain the city from awarding contracts for municipal work to other than the lowest bidder, even though the low bidder proposes to use Belgian cement in the contract.

"It would be manifestly impossible," said Director Murdoch, "for me to comment on the letter of notification, as I am bound by the action of the city council. When that body passes a resolution directing me to use only American-made cement and other materials there is nothing for me to do but obey.

"I shall turn the notice over to the city solicitor. My understanding is that the city council can do as it pleases in these matters."

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1927 AND 1928

Month	1927——Exports——1928 Barrels	Value	Barrels	Value	1927——Imports——1928 Barrels	Value	Barrels	Value
January	75,346	$254,072	56,400	$204,875	193,175	$269,661	234,753	$ 342,797
February	71,404	233,985	62,828	221,620	130,421	200,680	164,408	217,525
March	67,956	240,165	74,983	265,719	181,145	261,519	235,930	330,074
April	72,383	243,832	61,676	205,882	192,318	313,262	249,458	324,371
May	59,332	205,574	70,173	236,005	178,929	263,618	190,509	256,872
June	69,205	237,281	.....	.....	129,111	201,682	.....	.....
July	72,337	249,737	.....	.....	175,042	249,665	.....	.....
August	61,371	209,198	.....	.....	117,605	170,167	.....	.....
September	57,890	207,817	.....	.....	233,066	304,796	.....	.....
October	67,639	230,668	.....	.....	221,274	321,777	.....	.....
November	79,764	257,428	.....	.....	141,485	190,419	.....	.....
December	62,099	226,960	.....	.....	156,609	209,205	.....	.....
	816,726	$2,796,717	.....	.....	2,050,180	$2,956,451	.....	.....

Sand-Lime Brick Production and Shipments in June

THE following data are compiled from reports received direct from 23 producers of sand-lime brick located in various parts of the United States and Canada. The number of plants reporting is four less than those furnishing statistics for the May estimate published in the June 23 issue. The statistics below may be regarded as representative of the entire industry, the reporting plans having about one-half the production capacity in the United States and Canada.

Production remains about the same as in May, when a high figure was established, although five plants reported that they were not at present producing. Shipments by rail and truck remained about stationary, as did the stocks on hand. It is noted that the amount of unfilled orders are considerably lower than in May.

The following are average prices quoted for sand-lime brick in June:

Average Prices for June

Shipping Point	Plant Price	Delivered
Albany, Ga.	$10.00	.....
Atlantic City, N. J.	12.00	.....
Buffalo, N. Y.	12.50	$16.50
Dayton, Ohio	12.50	15.50
Detroit, Mich.	.....	16.00
Detroit, Mich. (less 5%)	.....	15.50@16.00
Detroit, Mich.	13.00	15.50
Detroit, Mich.	13.00@14.00	15.50@16.00
Flint, Mich.	.....	.....
Grand Rapids, Mich.	.....	.....
Hartford, Conn.	14.00	19.00
Madison, Wis.	12.00@12.50	13.00@14.00
Menominee, Mich.	11.00	14.50
Milwaukee, Wis.	10.50	13.00
Minneapolis, Minn.	10.00	12.75
New Orleans, La.	.....	.....
Pontiac, Mich.	12.00	14.00
Rochester, N. Y.	.....	19.75
Saginaw, Mich.	12.00	.....
Sebewaing, Mich.	.....	.....
Syracuse, N. Y.	18.00	20.00
Toronto, Canada	12.50	15.00
Winchester, Mass.	.....	16.00

The following statistics are compiled from data received direct from 23 producers of sand-lime brick in the United States and Canada:

Statistics for May and June, 1928

	*May	†June
Production	22,244,400	19,133,300
Shipments (rail)	7,751,700	5,120,300
Shipments (truck)	18,228,900	14,437,000
Stocks	12,159,000	11,656,000
Unfilled orders	14,445,000	11,718,000

*27 plants reporting.
†Incomplete, one plant not reporting stocks and five plants not reporting unfilled orders.

Notes From Producers

Sand Lime Products Co., Detroit, Mich., has furnished brick for the new assembly building of the Chrysler Motor Car Co. in Detroit, and also for the new Cass Garage at Cass and Lafayette avenues. About 150,000 brick were supplied for each building.

Belt Line Brick Co., Minneapolis, Minn., sent in the accompanying illustration for an attractive home recently completed with sand-lime brick supplied by the company. This house is one of a number of homes recently finished in the community, for which sand-lime brick was furnished by the Belt Line Co.

Sand-lime brick for this attractive home were furnished by the Belt Line Brick Co. of Minneapolis

United States Gypsum Buys Site for Chicago Plant

A SITE in the greater Chicago industrial district for the first of three new manufacturing plants to be erected by the United States Gypsum Co. at points advantageous to water transportation was purchased by the company on July 10.

The gypsum plant for the Chicago area will be constructed on a 32-acre tract on the Indiana Harbor canal at East Chicago, Ind., purchased from Stone and Melchor for a reported $170,000. Construction, it is understood, will start at once. Sites for similar plants have also been obtained at Philadelphia and Detroit and a plant is already under construction at Boston.

The entire project, it is understood, will cost around $6,000,000, and the funds for the purpose were secured recently through the offering of rights to the company's stockholders to purchase additional stock on the basis of one share for each two shares held. The building of the new plants marks the beginning of a policy to reduce costs, with the added impetus of lower transportation costs through water shipping.

The company is having special freight steamers built which it will use in carrying raw gypsum from the company's quarries at Windsor, Nova Scotia, and Alabaster, Mich. The raw product will be stored in special silos at the various plants.

The production in the East Chicago plant will be used to supply the Chicago metropolitan district and will supplement the shipments which heretofore have been made to Chicago from the company's plants at Fort Dodge, Iowa, and Grand Rapids, Mich.—*Chicago* (Ill.) *Tribune.*

International Cement Cartel Reported Shaky

THE PROPOSED international cement cartel, described elsewhere in this issue, is the subject of the following special cable to the *New York Times:*

Paris, June 25.—The American cement industry, which is feeling the results of increasing sales of European cement in American markets, is a very interested observer of current difficulties encountered here since the recent French cement production agreement.

"The importance of the present internal trouble lies in the fact that if the French agreement fails then the new European cement cartel can hardly be expected to continue operation with its chief member unable to reach the necessary domestic accord.

"Among the dozens of European industrial cartels which either have been revived or established since the war, the cement agreement between France, Belgium and Luxemburg is said to be giving Americans as much cause for worry as any of them.

"Failure to agree on quotas is the principal reason for French discord."

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Combining the Production of Aggregate with a Successful Products Operation

Plant of Geo. H. Krier, Brooklyn, N. Y., Produces Its Own Sand to Build Up a Large Market in the New York Area

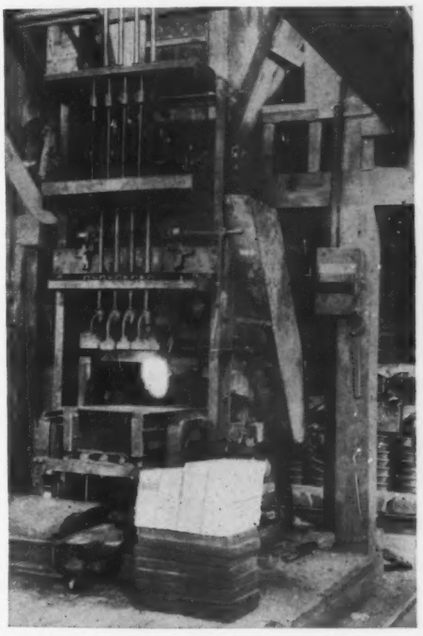
WITH each new season it becomes more and more evident that the cement products industry is on the way to a more stable basis. The chief reason probably is that the plants which are well planned and can afford to provide the modern equipment which competition requires are building up their business while the others are steadily losing ground. Unquestionably one of the big factors for success among some of the growing concerns is the supply of raw material which they own or control, although it does not signify that because a certain products company does not own its own gravel supply the company will be a failure. A good example of a products company which has used its natural advantage of a large supply of good sand is the plant of George H. Krier on the outskirts of Brooklyn, N. Y. This operation was started in 1911 on practically the same property which is now occupied, and has been developed rapidly, so that five years ago it was necessary to build a much larger plant than the former one. The new plant has the advantage of the sand pit adjacent to it, and also it was correctly planned for a large production, so that at the present time the Krier plant is one of the leaders in the New York metropolitan area.

The company owns and operates two gravel pits, one at the plant and another about a mile distant. At the plant the sand is excavated by a dragline having a 1-yd. bucket, and at the other pit a Northwest crane, also with a 1-yd. bucket, is used to load the sand to trucks which bring it to the plant. The dragline and the trucks dump to a hopper, from which the sand is taken by a belt feeder to the foot of a bucket elevator having 1-ft. buckets. The elevator raises the sand to a 16x4-ft. revolving screen from which the sand less than 5/8-in. falls into a 150-yd. hopper, while the rejects pass down a chute to the outside of the plant. Bank sand only is used, about 135 yd. being the amount needed daily.

Products Plant

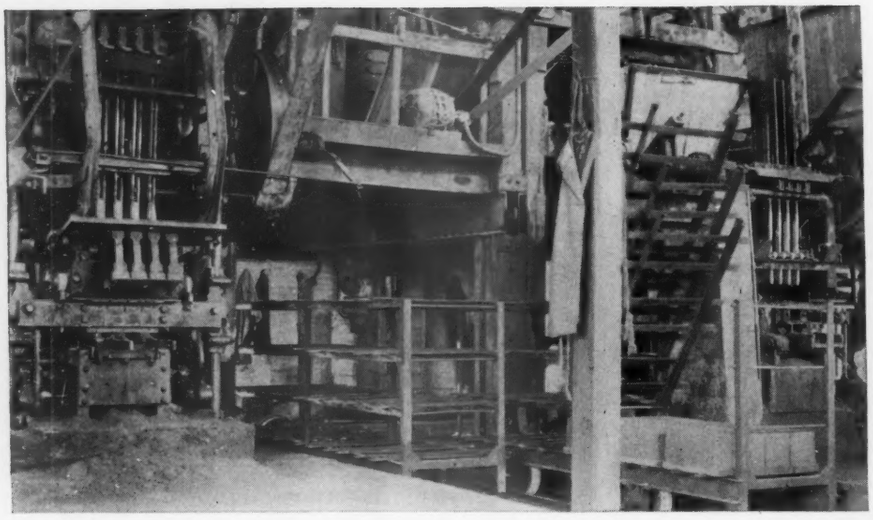
This plant uses the system of gravity flow of material to a large extent. The mixers are below the sand hopper, and the three block machines are on the ground floor, beneath the mixers. Each machine with its mixer is a complete unit in itself. The largest machine is a Besser No. 6 stripper capable of turning out six blocks per minute. There is an Ebering continuous mixer to supply this machine, placed immediately below the sand hopper so that the flow is continuous by gravity. A 15-hp. motor runs the stripper and a 5-hp. motor operates the mixer. These two motors are United States ball bearing motors, as are the others on the other mixers and block machines.

An overhead track runs from the gate under the sand hopper to the mixers for the two other machines, and a 7-cu. ft. bucket on this track feeds the two mixers. One bag of cement to each bucket-load of sand gives the 1:7 mix which the plant uses. There is a smaller Besser face-down block machine for making rock-face block. This receives its mix from a 14-ft. Besser barrel mixer which, as stated above, is fed by the car from the sand hopper. A 15-hp. motor is used to operate both the mixer and the machine. This machine will turn out about 1600 block in a nine-hour day. The mixer



The face-down block machine receives its material from the hopper above

The gravel pit at the Krier plant operated by a dragline scraper



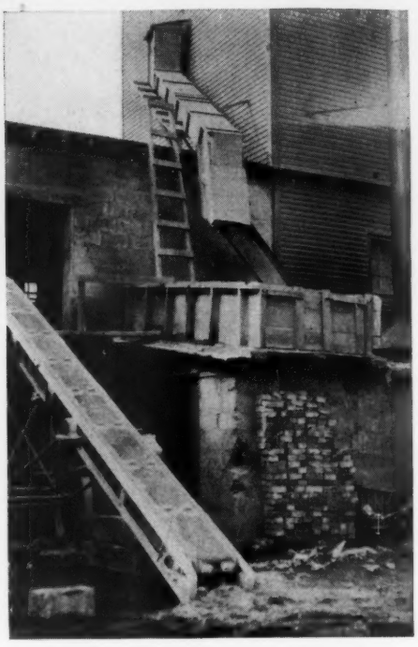
Two of the three block machines at the Krier plant, showing the arrangement of the tracks for the kiln cars for loading the racks

for the rock facing is a 9-ft. Blystone driven by 3-hp. motor. The third unit is an Anchor stripper, with a 14-ft. Besser mixer. A 7½-hp. motor drives both the mixer and the stripper. This machine will make about 3000 small units during the day, these being generally what are known as "Hollywood tile," 4x8x16-in. in size. The other machines make the standard 8x8x16-in. block for which there is the most demand. Some fraction blocks are made, but the plant does not turn out any other specials.

Unloading sand to hopper at the foot of the large elevator

There are six kilns for curing the blocks. Each kiln is 60 ft. long and 6½ ft. high, and five of them are 10 ft. wide, while the other is 12 ft. wide. The latter contains three tracks, and the others have two tracks each. To maintain the steady flow of the product through the plant, the blocks are taken in at the end nearest the machines and removed at the far end. Besser roller-bearing kiln cars with lift racks are used, each car being capable of holding 120 of the 8-in. block or 72 of the 12-in. block. There are two live steam lines in the large curing room and one line in each of the smaller curing rooms. These are all 1½-in. lines, with 3/16-in. holes bored every 10 in. to provide uniform mositure throughout the whole kiln. The blocks are usually left in the kilns over night, thus insuring 14 hours of curing before they are piled in the storage piles outside.

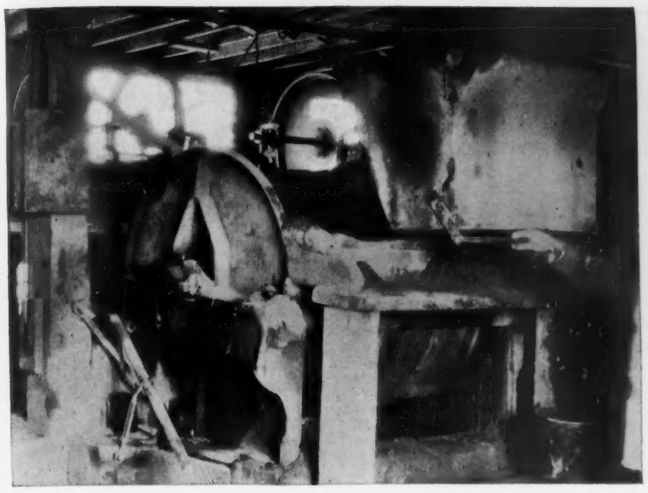
This plant turns out on the average 6000 blocks per day for 10 months, and these are stored in the large storage yard when not shipped at once. A New Jersey portable conveyor, powered by a General Electric motor, is used particularly for piling the block before the winter shut-down. It is also used to deliver bags of cement to the second floor of the plant where they can be conveniently handled to the mixers.



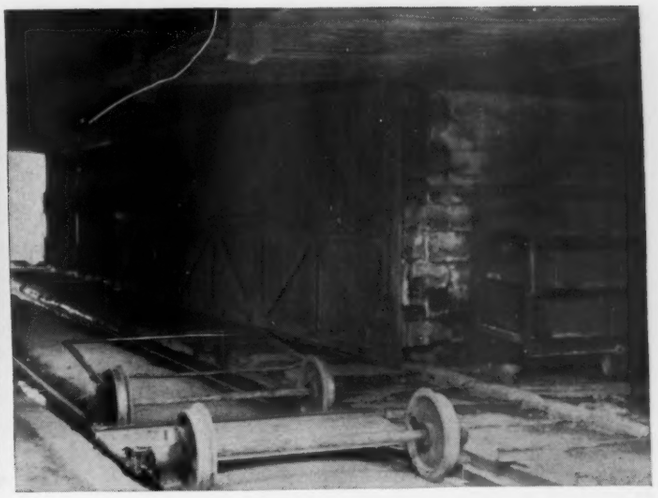
Showing the chute for removing large cinders, and the portable conveyor for cement at left

Ray rotary crude oil burners, alternating

A general view of the plant of Geo. H. Krier, in Brooklyn, showing the sand pit at the left, the main plant in the left cencntrance to the build-



Mixer on second floor, and batch box on overhead track



The outlet end of the kilns at the Krier plant

current type, from San Francisco, Calif., are used to provide the heat for steam at the Krier plant, and the boiler used was supplied by the Pennsylvania Boiler Works.

The property of the company lies beside the right-of-way of the electrified Long Island railroad, well out on the southeast edge of Brooklyn, although the city is growing rapidly toward the property. It is this rapid growth which provides the best market for the block, as practically all of the company's product is trucked out in the company's own trucks and is used for building in that section of the city. The company owns three 7-ton Mack trucks and six 3½-ton Stewart trucks for delivering the block, and for bringing sand from the other pit, as well as for bringing in cement. At present there is no siding on the Long Island railroad at this point, but the other property is also on a railroad, and it is planned to build a siding there to ship out sand and gravel. The property at the plant includes not only the gravel pit, plant and storage yard, but also includes an office and general material yard.

The Krier plant employs 12 men for work in the plant itself, and nine others for work in the storage and material yards. There are two salesmen out over the territory all of the time, and also there are two more persons employed in the office. George H. Krier is the owner and operator of the whole plant, and R. Warren is his superintendent.

Ottawa Sands, Inc., Plan Big Silica Development

ANOTHER new steel molding sand plant will be constructed and in operation just west of Ottawa, Ill., by September 1, it was announced July 7. A group of Chicago men have acquired a big sand acreage which lies west of Moriarty hill and north of the Rock Island railroad, and have plans all completed for the formation of a $500,000 company to be known as Ottawa Sands, Inc.

Application has already been made to the secretary of state at Springfield for papers of incorporation, which list the authorized capital stock of the company at half a million. The three incorporators are Hiram A. Cooley, Arthur B. Hewson and John A. Balko, all of Chicago. The main offices of the company are to be in the Conway building in Chicago.

A. B. Hewson, who formerly was vice-president of the Ottawa Silica Molding Sand Co., is to be in general charge of operation and sales of the Chicago office. Mr. Hewson is an experienced sand man. H. A. Cooley, who was active in starting the Ottawa Silica Molding Sand Co., is in charge of construction and production.

The firm of Battey and Kipp, consulting engineers, has completed plant and layout plans. The plant will represent the highest efficiency in silica sand production in every respect. A 2½-yd. steam shovel, a 4-yd. steam shovel and a large rock crusher have already been purchased.

The plant is to have a capacity of 45 cars in 10 hours. Between 15 and 20 men are to be employed. As soon as the crude sand equipment is in operation, a large washed sand plant will be constructed.

ter, with the kilns in the foreground, and the storage yard all around, and at the right the office of the company and the ing matetial yard

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	1.75	1.60	1.30	1.30	1.30
Dundas, Ont.	.53	1.05	1.05	.90	.90	.90
Farmington, Conn.	.....	1.30	1.10	1.00	1.00	.....
Frederick, Mo.	.50@ .75	1.35@1.45	1.15@1.25	1.10@1.20	1.05@1.15	1.05@1.10
Ft. Spring, W. Va.	.35	1.30	1.30	1.25	1.20	1.15
Munns, N. Y.	1.00	1.25	1.25	1.25	1.15	.....
Prospect, N. Y.	1.00	1.40	1.25	1.25	1.25	.....
Rochester, N. Y.—Dolomite	1.50	1.50	1.50	1.50	1.50	1.50
St. Vincent de Paul, Que. (n)	.75	1.35	1.15	.95	.85	1.35
Walford, Penn.	.....	.....	1.35h	1.35h	1.35h	1.35h
Watertown, N. Y.	1.00	1.75	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL:						
Afton, Mich.	.....	.....	.....	.....	.....	.50@1.50
Alton, Ill.	1.85	.....	1.85	.....	.....	.....
Columbia and Krause, Ill.	1.05@1.40	.95@1.50	1.15@1.50	1.05@1.50	1.05@1.50	.....
Cypress, Ill.	1.00@1.25	1.00@1.25	1.20@1.25	1.20@1.25	1.20@1.25	1.35
Dubuque, Iowa	.85	1.00	1.25	1.25	1.25	.....
Greencastle, Ind.	1.35	1.10	1.10	1.00	1.00	1.00
Lannon, Wis.	1.00	1.00	1.00	.90	.90	.90
Linwood, Iowa	1.10	1.50	1.50	1.30	1.40	1.40
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
Marblehead, Ohio (l)	.55	.80	.80	.80	.80	.80
Milltown, Ind.	.....	.90@1.00	1.00@1.10	.90@1.00	.85@ .90	.85@ .90
Northern Ohio Points	.85@1.15	1.25	1.15	1.15	1.15	1.15
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	.....	1.20	1.10	1.00	.....
Thornton, Ill.	.90	1.00	1.25	1.25	1.25	1.25
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada (m)	2.50	3.00	3.00	2.85	2.85	2.85
Valmeyer, Ill. (fluxing limestone)	.90@1.20	.....	.....	1.75	.....	1.75
Waukesha, Wis.	.....	.90	.90	.90	.90	.....
Winona, Minn.	1.00	1.20	1.30	1.40	1.40	1.40
Wisconsin Points	.50	.....	1.00	.90	.90	.....
Youngstown, Ohio	.70j	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h
SOUTHERN:						
Cartersville, Ga.	1.35	1.65	1.65	1.35	1.15	.....
Chico, Texas	1.00	1.30	1.25	1.20	1.10	1.05
Cutler, Fla.	.40r@ .75r	.....	.....	1.75r	.....	1.10r
El Paso, Tex.	1.00	1.00	1.00	1.00	1.00	.....
Graystone, Ala.	Crusher run, screened, $1 per ton					
Kendrick and Santos, Fla.	3½ in. and less, $1 per ton					
Olive Hill, Ky.	.....	1.00	1.00	1.00	1.00	1.00
Rocky Point, Va.	.50@ .75	1.40@1.60	1.30@1.40	1.15@1.25	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kan.	.50	1.80	1.80	1.80	1.80	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35e	1.25d	1.20
Cape Girardeau, Mo.	1.25	.....	1.25	1.25	1.00	.....
Rock Hill, St. Louis, Mo.	1.00	1.25	1.00@1.25	.90@1.25	.90@1.25	.90@1.25
Sugar Creek, Mo.	.75	1.00	1.20	1.20	1.20	1.20

(r) Cubic yard.

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Birdsboro, Penn. (q)	1.20	1.60	1.45	1.35	.....	1.30
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Tex.	2.50	2.25	1.65	1.35	1.25	.....
New Britain, Plainville, Rocky Hill, Wallingford, Meridan, Mt. Carmel, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.40@1.45	1.40@2.10	1.90	1.40@1.50	1.40@1.50	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
Spring Valley, Calif.	.75	1.10	1.10	1.10	1.10	.....
Springfield, N. J.	1.35@1.50	2.10	2.00	1.60	1.60	.....
Toronto, Canada (m)	.....	5.80	4.05	4.05	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	.....
Cayce, S. C.—Granite	.....	.....	1.80	1.80	1.65	.....
Eastern Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.—Flint rock	1.00	.....	2.35	.....	.....	.....
Lithonia, Ga.—Granite	.75a	2.00b	2.00	1.60	1.40	1.35
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@3.00
Richmond, Calif.—Quartzite	.75	.....	1.00	1.00	1.00	.....
Somerset, Penn. (sand-rock)	.....	.....	1.50 to 1.85			
Toccoa, Ga.	.....	.....	1.30	1.25	1.25	1.25

(a) Sand. (b) to ¾ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Price net after 10c cash discount deducted. (f) 1 in. to ¼ in., 1.45; 2 in. to ¼ in., 1.35. High calcite fluxing stone, 1.40. (h) Less 10c discount. (j) Less 10% net ton. (l) Less .05. (m) Plus .25 per ton for winter delivery. (n) Crusher run for ballast, .85. (p) Carload prices. (q) Crusher run, 1.40; ¼-in. granolithic finish, 3.00. (r) Cubic yd.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis, 98% $CaCO_3$, 0.01% $MgCO_3$; 90% thru 100 mesh.. 6.00

Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh 1.50

Blackwater, Mo.—100% thru 4 mesh.. 1.00

Branchton, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh..... 5.00

Cape Girardeau, Mo.—Analysis, $CaCO_3$, 94½%; $MgCO_3$, 3½%; 90% thru 50 mesh..... 1.50

Cartersville, Ga.—50% thru 50 mesh.... 1.50

Pulverized, per ton..... 2.00

Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk..... 2.50

Cypress, Ill.—Analysis, 88% $CaCO_3$; 10% $MgCO_3$; 50-90% thru 4 mesh.. 1.25
50-90% thru 100 mesh..... 1.35

Danbury, Conn., and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$; 5% $MgCO_3$; fine ground, 90% thru 100 mesh; bulk..... 3.50
Paper bags 4.75
100 lb. cloth bags..... 5.25
(All prices less .25 cash 15 days)

Hillsville, Penn.—Analysis, 94% $CaCO_3$; 1.40% $MgCO_3$; 75% thru 100 mesh; sacked..... 5.00

Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh; bags 3.95

Bulk 2.70

Jamesville, N. Y.—Analysis 89% $CaCO_3$, 4% $MgCO_3$; pulverized; bags 4.25

Joliet, Ill.—Analysis, 52% $CaCO_3$; 44% $MgCO_3$; 90% thru 50 mesh; bulk 2.50

Knoxville, Tenn.—80% thru 100 mesh; bags, 1.25; bulk..... 2.70

Linwood, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 200 mesh, bags, per ton..... 6.00
90% thru 20 mesh, bulk, per ton..... 1.50

Marlbrook, Va.—Analysis, 80% $CaCO_3$; 10% $MgCO_3$; bulk..... 1.75

Marl—Analysis, 95% $CaCO_3$; 0% $MgCO_3$; bulk 2.25

Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; per ton..... 2.00

Middlebury, Vt.—Analysis 99.05% $CaCO_3$; 90% thru 50 mesh; bulk, 4.00; paper bags..... 5.00

Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk..... 1.35@ 1.60

Olive Hill, Ky.—90% thru 4 mesh..... 1.00

Piqua, Ohio—Total neutralizing power 101.12%; 99% thru 10, 60% thru 50; 45% thru 100..... 2.50

100% thru 10, 90% thru 50, 70% thru 100; bags, 5.00; bulk..... 3.50

100% thru 4, 30% thru 100, bulk..... 1.50

Rocky Point, Va.—Analysis, $CaCO_3$, 97%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk..... 2.00

Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk 2.50

Agricultural Limestone

(Crushed)

Bedford, Ind.—Analysis, 98% $CaCO_3$; 1%, $MgCO_3$; 95% thru 10 mesh..... 1.50

(Continued on next page)

Agricultural Limestone

Chico and Bridgeport, Tex. — 50% thru 100 mesh	1.50
Dubuque, Iowa—50% thru 4 mesh	.85
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Spring, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 50 mesh	1.00
Kansas City, Mo. — 50% thru 100 mesh	1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% thru 10 mesh; 46% thru 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Linwood, Iowa—Analysis, 97% $CaCO_3$; 2% and less $MgCO_3$; 90% thru 10 mesh, per ton	1.25
90% thru 4 mesh, per ton	1.10
Marblehead, Ohio—90% thru 100 mesh	3.00
90% thru 50 mesh	2.00
90% thru 4 mesh	1.00
McCook, Ill.—90% thru 4 mesh	.90
Middlepoint, Bellevue, Bloomville, Kenton and Whitehouse, Ohio; Monroe, Mich.; Bluffton, Greencastle and Logansport, Ind.—85% thru 10 mesh, 20% thru 100 mesh	1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Mountville, Va. — Analysis, 76.60% $CaCO_3$; $MgCO_3$, 22.83%, 100% thru 20 mesh; 50% thru 100 mesh, paper bags, 4.50; burlap bags	5.00
Stone City, Iowa — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.10
90% thru 50 mesh	1.65
Valmeyer, Ill.—Analysis, 96% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.10@1.70

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Joliet, Ill. — Analysis, 50% $CaCO_3$; 42% $MgCO_3$; 95% thru 100 mesh; paper bags (bags extra)	3.50
Linwood, Iowa—Analysis 97% $CaCO_3$; 2% and less $MgCO_3$; 100% thru 20 mesh, 50% thru 200 mesh; paper sacks	6.00
Marblehead, Ohio — Analysis, 83.54% $CaCO_3$; 14.92% $MgCO_3$; 99.8% thru 100 mesh; sacks	4.25
Piqua, Ohio, sacks, 4.50@5.00; bulk	3.00@ 3.50
Rocky Point, Va.—85% thru 200 mesh, bulk	2.25@ 3.50
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Cedarville and S. Vineland, N. J.	*1.75@ 2.25
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.00
Klondike, Mo.	2.00
Massillon, Ohio	3.00
Michigan City, Ind.	.30@ .35
Ohlton, Ohio	2.50@ 3.00
Ottawa, Ill.	1.25
Red Wing, Minn.	1.50
San Francisco, Calif.	4.00@ 5.00
Silica and Mendota, Va.	2.00
St. Louis, Mo.	2.00
Utica and Ottawa, Ill.	.75@ 1.00
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.50
Dresden, Ohio		1.25
Eau Claire, Wis.	4.25	
Estill Springs and Sewanee, Tenn.	1.35@1.50	1.35@1.50
Franklin, Penn.		1.75
Massillon, Ohio		2.00
Michigan City, Ind.		.30
Montoursville, Penn.		1.25
Ohlton, Ohio	2.00	2.00
Ottawa, Ill.	3.25	1.25
Red Wing, Minn.		1.00
San Francisco, Calif.	3.50	3.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Asbury Park, Farmingdale, Spring Lake and Wayside, N.J.	.65	.55	1.00	1.35	1.40	
Attica and Franklinville, N. Y.	.65	.65	.75	.65	.65	.65
Boston, Mass.‡	1.40	1.40	1.40		2.25	2.25
Buffalo, N. Y.	1.10	1.05	1.05	1.05		1.05
Erie, Penn.	.60	.85		1.40		
Leeds Junction, Me.		.50		1.75	1.25	1.00
Machias Jct., N. Y.	.75	.65	.65		.65	.65
Montoursville, Penn.	1.00	.80	.75	.65	.65	.60
Northern New Jersey	.50	.50	1.25	1.35	1.25	
Somerset, Penn.		2.00				
Troy, N. Y.	.50@ .75*	.50@ .75*	.80@1.00*	.80@1.00*		.80@1.00*
F. o. b. boat, per yd.	1.50	1.50	1.75	1.75		1.75
Washington, D. C.	.55	.55	1.30	1.30	1.00	1.00
CENTRAL:						
Attica, Ind.			All sizes .75@.85			
Aurora, Moronts, Oregon, Sheridan, Yorkville, Ill.	.50	.35	.20	.50	.60	.60
Barton, Wis.		.40	.60	.65	.65	.65
Chicago District	2.00j					
Columbus, Ohio¶		.70	.70	.70	.70	
Des Moines, Iowa		.40	1.50	1.50	1.50	1.50
Eau Claire, Chippewa Falls, Wis.		.40	.55@ .75	.85	.85	
Elkhart Lake, Wis.	.60	.40	.50	.60	.50	.50
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Grand Haven, Mich.		.60@ .80	.70@ .90	.70@ .90		.70@ .90
Grand Rapids, Mich.	.50	.50	.90	.80	.70	.70
Hamilton, Ohio		1.00	1.00		1.00	
Hersey, Mich.		.50		.60		.70
Humboldt, Iowa	.35	.35	1.35	1.35	1.35	1.35
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Mankato, Minn.		.45g		.60@1.25h	.70@1.25	1.25c
Mason City, Iowa		.50	.85	1.30	1.25	1.25
Mattoon, Ill.			.75@.85 all sizes			
Milwaukee, Wis.	.96	.91	1.06	1.06	1.06	1.06
Minneapolis, Minn.	.65*	.65*	1.75*	1.75*	1.75*	1.75*
St. Louis, Mo.	1.20e	1.45f	1.55a	1.45	1.45	1.45
St. Paul, Minn.	.35	.35	1.25	1.25	1.25	1.25
Terre Haute, Ind.	2.75	.60	.85	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.15	1.10
SOUTHERN:						
Brewster, Fla.	.50	.50	3.00	3.00		
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Charleston, W. Va.			River sand and gravel, all sizes, 1.40			
Eustis, Fla.		.45				
Fort Worth, Tex.	.75	1.00	1.00	1.00	1.10	1.10
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.65@ .90	.65@ .90	2.25@2.50	2.25@2.50	2.25@2.50	2.25@2.50
New Martinsville, W. Va.	1.10	1.00		1.30	1.10	.90
Roseland, La.	.35	.15	.85	.85	.75	.75
WESTERN:						
Kansas City, Mo.	.70	.70@ .75				
Crushton, Durbin, Kincaid, Largo, Rivas. Calif.	.10@ .40	.10@ .40	.50@1.00	.50@1.00	.50@1.00	.50@1.00
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Otay, Calif.		.35@ .50	.60	.60	.60	.60
Phoenix, Ariz. (k)	1.25*	1.15*	1.50*	1.25*	1.15*	1.10*
Pueblo, Colo.	.80	.60		1.20		1.15
Seattle, Wash.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Steilacoom, Wash.	.50	.50	.50	.50	.50	.50

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Brookhaven, Miss.						.60
Buffalo, N. Y.	1.10	.95		.85		.85
Burnside, Conn.		.75*				
Des Moines, Iowa				.50		
Dresden, Ohio				.70	.65	
Eau Claire, Chippewa Fls., Wis					.65	
Fort Worth, Texas						.65
Gainesville, Texas						.55
Grand Rapids, Mich.				.50		
Hamilton, Ohio					1.00	
Hersey, Mich.				.50		.50
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Macon, Ga.	.35					
Oregon City, Ore.	1.25*	1.25*	1.25*	1.25*	1.25*	1.25*
Somerset, Penn.		1.85@2.00		1.50@1.75		
Steilacoom, Wash.	.25					
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.40	.40	.60	.60	.60	.60
York, Penn.	1.10	1.00				

*Cubic yd. ‡Delivered on job by truck. (a) ⅜-in. down. (b) River run. (c) 2½-in. and less. ¶By truck only. (d) Delivered in Hartford, Conn., $1.50 per yd. (e) Mississippi River. (f) Meramec River. (g) Washed and screened river sand. (h) ¾-in. to ¼-in. (j) Lake sand, 1.75, delivered. (k) 60-70% crushed boulders.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Albany, N. Y.	2.00	2.00	2.00	1.00@2.25	2.00	2.25@4.00	.....
Beach City, Ohio	1.75	1.75	.....	1.75@2.00	1.75@2.00	.....	1.65
Dresden, Ohio	1.25@1.50	1.25@1.50	1.50@1.75	1.00@1.25	.....	.....	.....
Eau Claire, Wis.	.....	.....	.....	.....	.....	3.00	.....
Elco & Tamms, Ill.	Ground silica per ton in carloads—18.00@31.00						
Estill Springs and Sewanee, Tenn.	1.25	.....	.....	1.25	.....	1.35@1.50	.....
Franklin, Penn.	1.75	1.75	.....	1.75	.....	.....	.....
Kasota, Minn.	.....	.....	.....	.....	.....	.....	1.00
Kerrs, Ohio	1.10@1.50	1.25@2.00	2.00	.....	.....	2.75@3.00	.....
Massillon, Ohio	2.00	2.00	.....	2.00	2.00	.....	.....
Michigan City, Ind.	.....	.....	.....	.30@ .35	.....	.....	.....
Montoursville, Penn.	.....	.....	.....	1.35@1.50	.....	.....	.....
New Lexington, O.	2.00	1.25	.....	.....	.....	.....	.....
Ohlton, Ohio	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Ottawa, Ill.	1.00	1.25	1.50	1.75	1.25	3.50	2.00
Red Wing, Minn. (d)	.....	.....	.....	.....	1.50	3.00	1.50
San Francisco, Calif.[1]	3.50†	5.00†	3.50†	3.50@5.00†	3.50@5.00†	3.50@5.00†	.....
Silica, Mendota, Va.	Potters flint, 8.00@10.00g						
Utica & Ottawa, Ill.	.40@1.00f	40.@1.00f	.75@1.00	.40@1.00f	.60@1.00f	2.23@3.25	1.00@3.25
Utica, Ill.	.60	.70	.....	.75	1.00	.....	.....
Warwick, Ohio	1.50*@2.00	1.50*@2.00	.....	1.50*@2.00	.....	.....	.....
Zanesville, Ohio	2.00	1.50	2.00	2.50	2.00	.....	.....

*Green. †Fresh water washed, steam dried. [1]Core, washed and dried, 2.50. (d) Filter sand, 3.00. (e) Filter sand, 3.00@4.25. (f) Crude and dry. (g) also 12.00@14.00.

Crushed Slag

City or shipping point EASTERN:	Roofing	¼ in. down	⅜ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
Buffalo, N. Y., Erie and Dubois, Pa.	2.25	1.25	1.25	1.35	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.00	1.00	.....	1.25	.....	.....	.....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05*	1.30*	1.80*	1.45*	1.45*	1.45*	.....
Jackson, Ohio	2.05*	1.05*	1.80*	1.30*	1.05*	1.30*	.....
Toledo, Ohio	1.50	1.35	1.35	1.35	1.35	1.35	1.35
SOUTHERN:							
Ashland, Ky.	.....	1.45*	.....	1.45*	1.45*	1.45*	.....
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.†	2.05*	.55*	.....	1.15*	.90*	.90*	.....

5c per ton discount on terms. †1¼ in. to ¼ in., $1.05; ⅝ in. to 10 mesh, $1.25*; ⅝ in. to 0 in., .90*; ¼ in. to 10 mesh, .80*.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

EASTERN:	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.00
Buffalo, N. Y.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Lime Ridge, Penn.	.....	.....	.....	.....	.....	.....	5.00	.....
West Stockbridge, Mass.	12.00	10.00	5.60	.....	.....	.....	.....	2.00[13]
Williamsport, Penn.	10.00@11.00	8.50@9.00	8.50@9.00	.....	7.00	9.00	5.00	.....
York, Penn., & Oranda, Va.	11.50[7]	8.50@9.50[7]	8.50@9.50[7]	8.50@10.50[7]	8.00	9.25	7.00	1.40[3]
CENTRAL:								
Afton, Mich.	.....	.....	.....	.....	.....	.....	7.50	1.35
Carey, Ohio	11.50	7.50	7.50	.....	8.00	.....	8.00	.....
Cold Springs, Ohio	.....	8.00	8.00	.....	.....	.....	8.00	.....
Gibsonburg, Ohio	11.50	.....	.....	.....	8.00	10.00	.....	.....
Huntington, Ind.	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Luckey, Ohio[5]	12.50	.....	.....	.....	.....	.....	.....	.....
Milltown, Ind.	.....	8.50@10.00	.....	10.00[8]	.....	.....	8.50[22]	1.35[10]
Ohio points	11.50	7.50	7.50	12.00	8.00	11.00	7.50	1.50[16]
Scioto, Ohio	.....	7.50	7.50	8.50	8.25	.62½	7.00	1.50
Sheboygan, Wis.	.....	10.50	10.50	.....	.....	.....	9.50	2.00[4]
Wisconsin points[9]	.....	11.50	.....	.....	.....	.....	9.50	.....
Woodville, Ohio	11.50	7.50	7.50	12.50	8.00	10.00[9]	9.00	1.50[3]
SOUTHERN:								
El Paso, Texas	.....	.....	.....	.....	.....	.....	7.00	1.50
Frederick, Md.	.....	8.00@9.50	8.00@9.50	.....	.....	9.50[15]	7.00[15]	.....
Graystone & Landmark, Ala.	12.50	9.00	.....	.....	.....	.....	7.00	1.35
Keystone, Ala.	19.00	9.00	9.00	10.00	.....	.....	7.50	1.35
Knoxville, Tenn.	19.00	9.00	9.00	9.00	.....	.....	7.50	1.35
Ocala, Fla.	.....	10.00	9.00	.....	.....	.....	10.00	1.40
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
Los Angeles, Calif.	15.00	14.00	12.00	18.00	.....	.....	13.50	.....
San Francisco, Calif.	19.50	16.00	12.50	16.00@19.50	14.50	.90[17]	14.50	1.85[17]
Tehachapi, Calif.[13]	10.80	.....	6.75[11]	12.00	.....	.....	10.30	.....
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00	.....	18.60	2.30

[1] Barrels. [2] Net ton. [3] Wooden, steel 1.70. [4] Steel; in bbl. .95. [5] Dealers' prices, net 30 days less 25c discount per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days. [7] In paper bags, including bags. [8] To 11.00. [9]80-lb. [10] To 1.50. [11] Refuse or air slack, 10.00@12.00. [12] To 3.00. [13] Delivered in Southern California. [15] To 8.00. [16] To 1.70. [17] Less credit for return of empties. [22] To 9.00. [30] To 16.50.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing Sand	Traction
Utica & Ottawa, Ill.	1.00@ 3.25	.75
Warwick, Ohio	.....	2.00
Zanesville, Ohio	.....	2.50

*Damp.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:
- Crude talc (for grinding) ..... 4.00@50.00
- Ground talc (20-50 mesh), bags 8.00
- Ground talc (150-200 mesh), bags ..... 8.50@15.50
- Pencils and steel crayons, gross ..... 1.00@ 2.00

Chester, Vt.:
- Ground talc (150-200 mesh), paper bags ..... 9.00@10.00
- Same, burlap bags, bags extra ..... 8.00@ 9.00

Chicago and Joliet, Ill.:
- Ground (150-200 mesh), bags 30.00

Cromleys Mt., Md.:
- Crude talc 63.00

Dalton, Ga.:
- Crude talc (for grinding) 5.00
- Ground talc (150-200 mesh), bags 12.00
- Pencils and steel worker's crayons, per gross ..... 1.00@ 2.50

Emeryville, N. Y.:
(Double air floated) including bags;
- 325 mesh 14.75
- 200 mesh 13.75

Glendon, N. C.:
- Ground talc (150-200 mesh), bulk ..... 6.00@10.00
- Ground talc (150-200 mesh), bags ..... 8.00@14.00
- Pencils and steel crayons, gross ..... 1.05@ 2.00
- Blanks, .08 per lb.; cubes 50.00

Hailesboro, N. Y.:
- Ground white talc (double and triple air floated) 200-lb. bags, 300-350-mesh ..... 15.50@20.00

Henry, Va.:
- Crude (mine run) ..... 3.50@ 4.00
- Ground talc (150-200 mesh), bags ..... 7.50@14.00

Joliet, Ill.:
Ground talc (200 mesh) in bags:
- California white 30.00
- Southern white 20.00
- Illinois talc 10.00

Keeler, Calif.:
- Ground (200-300 mesh), bags ..... 20.00@30.00

Natural Bridge, N. Y.:
- Ground talc (300-325 mesh), bags ..... 12.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

- Columbia, Tenn.—B.P.L. 65-70% ..... 3.50@ 4.50
- Gordonsburg, Tenn.—B.P.L. 65-70% ..... 3.75@ 4.00
- Mt. Pleasant, Tenn.—B.P.L. 72% ..... 5.00@ 5.50
- Tennessee — F.o.b. mines, gross ton, unground brown rock, B.P.L. 72% 5.00
- B.P.L. 75% 6.00
- Twomey, Tenn.—B.P.L. 65%, 2000 lb. ..... 8.00@ 9.00

Ground Rock

(2000 lb.)

- Centerville, Tenn.—B.P.L. 65% 8.00
- Gordonsburg, Tenn.—B.P.L. 65-70% ..... 3.75@ 4.50
- Mt. Pleasant, Tenn.—B.P.L. 72% ..... 5.00@ 5.50
- Twomey, Tenn.—B.P.L. 65% ..... 8.00@ 9.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton)

- Florida — F.o.b mines, gross ton, 68/66% B.P.L., Basis 68% 3.25
- 70% min. B.P.L., Basis 70% 3.75

Mica

Prices given are net, f.o.b. plant or nearest shipping point.

- Pringle, S. D.—Mine run, per ton 125.00
- Punch mica, per lb. ..... .06
- Scrap, per ton, carloads 20.00
- Rumney Depot, N. H.—Per ton, Mine run 300.00
- Clean shop scrap 25.00
- Mine scrap ..... 22.50@24.00
- Roofing mica 37.50
- Punch mica, per lb. ..... .12

Cut mica—50% from Standard List.

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Brandon, Vt. — English pink, English cream and coral pink	¶12.50@‖14.50	¶12.50@‖14.50
Brighton, Tenn.—Pink marble chips	§3.00	§3.00
Crown Point, N. Y.—Mica spar		9.00@10.00
Davenport, Ia.—White limestone, in bags	6.00	6.00
Easton, Penn.		8.00@ 9.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio—Concrete facings and stucco dash		11.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury, Vt.—Middlebury white	¶9.00@‖10.00	¶9.00@‖10.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags		4.00@ 5.50
Phillipsburg, N. J.—Royal green granite		14.00@18.00
Randville, Mich.—Crystalite crushed white marble, bulk	4.00	4.00@ 7.00
Rose pink granite, bulk		12.00
Stockton, Calif.—"Natrock" roofing grits		12.00@18.00
Tuckahoe, N. Y.—Tuckahoe white	10.00	
Warren, N. H.		¶7.90@‖8.95
Wauwatosa, Wis.		20.00@32.00
Wellsville, Colo. — Colorado Travertine Stone	15.00	15.00

†C.L. L.C.L. 16.00.
§Bulk, car lots, minimum 30 tons.
¶C.L. ‖L.C.L.

Potash Feldspar

Auburn and Topsham, Me. — Color white, 98% thru 140-mesh	19.00
Buckingham, Ore.—White, analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; analysis, K_2O, 9.63%; Na_2O, 1.01%; SiO_2, 69.72%; Fe_2O_3, .00%; Al_2O_3, 18.6%; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 40 mesh to 200 mesh	15.00@28.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton	22.00
Glen Tay Station, Ont.—Color, red or pink; analysis, K_2O, 12.81%; crude	7.00
Keystone, S. D.—White; bulk (crude)	8.00
Los Angeles, Calif.—Color, white; analysis, K_2O, 12.16%; Na_2O, 1.53%; SiO_2, 65.60%; Fe_2O_3, .10%; Al_2O_3, 19.20%; Arizona spar, crude, bags, 12.50@14.00; bulk	11.00@12.50
Pulverized, 95% thru 200 mesh; bags, 19.73@23.50; bulk	15.75@22.50
Pulverized, 20% thru 80 mesh; bags, 17.60; bulk	16.50
Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk	20.00
Penland, N. C.—White; crude, bulk	8.00
Ground, bulk	16.50
Spruce Pine, N. C.—Color, white; analysis, K_2O, 10%; Na_2O, 3%; SiO_2, 68%; Fe_2O_3, 0.10%; Al_2O_3, 18%; 99½% thru 200 mesh; bulk. (Bags 15c extra.)	18.00
Crude feldspar, bulk	9.00
Tenn. Mills—Color, white; analysis K_2O, 10%; Na_2O_3, 3%; 68% SiO_3; 99½% thru 200 mesh; bulk (Bags, 15c extra)	18.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00

Chicken Grits

Afton, Mich.(Limestone), per ton	1.75
Belfast, Me.—(Limestone), per ton	‡10.00
Chico and Bridgeport, Tex.—Hen	¶9.00
Baby chick, per ton	¶8.00
Danbury, Conn.; Adams, Ashley Falls, and West Stockbridge, Mass. (Limestone)	‡7.50@*9.00
Davenport, Ia.—(Limestone) bags, per ton	6.00
Easton, Penn.—In bags	8.00
El Paso, Tex.—Per ton	1.00
Knoxville, Tenn.—Per bag	1.25
Los Angeles, Calif.—(Feldspar), per ton, including sacks	14.00
Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag	.50
Middlebury, Vt.—Per ton	10.00
Randville, Mich.—(Marble), bulk	6.00
Rocky Point, Va.—(Limestone), 100-lb. bags, 50c; sacks, per ton, 6.00; bulk	5.00
Seattle, Wash.—(Gypsum), bulk, per ton	10.00
Tuckahoe, N. Y.	8.00
Waukesha, Wis.—(Limestone), per ton	8.00
Wisconsin Points—(Limestone), per ton	15.00
Winona, Minn.—(Limestone), sacked, per ton, $8.00; bulk, per ton	6.00

*L.C.L. †Less than 5-ton lots. ‡C.L. ¶100-lb. bags.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, Ga.	9.00@10.00
Anaheim, Calif.	10.50@11.00
Barton, Wis.	10.50
Boston, Mass.	17.00*
Brighton, N. Y.	19.75*
Brownstone, Penn.	11.00
Dayton, Ohio	12.50@13.50
Detroit, Mich.	13.00@16.00*d
Farmington, Conn.	13.00
Flint, Mich.	18.00†
Grand Rapids, Mich.	12.50@14.50e
Hartford, Conn.	14.00@19.00*
Jackson, Mich.	13.00
Lakeland, Fla.	10.00@11.00
Lake Helen, Fla.	9.00@12.00
Lancaster, N. Y.	12.50
Madison, Wis.	12.00@12.50a
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00*
Minneapolis, Minn.	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	12.50@15.00*
Portage, Wis.	15.00
Prairie du Chien, Wis.	18.00@22.50
Rochester, N. Y.	19.75
Saginaw, Mich.	13.50
San Antonio, Texas	16.00
Sebewaing, Mich.	12.50
Sioux Falls, S. Dak.	13.00
South River, N. J.	13.00
Syracuse, N. Y.	13.00@16.00
Toronto, Canada	15.00*
Wilkinson, Fla.	12.00@16.00
Winnipeg, Canada	15.00

*Delivered on job. †5% disc., 10 days. ¶Dealers' price. (a) Less 50c discount per M. 10th of month. (d) 5% disc., 10th of month. (e) Delivered in city limits.

Portland Cement

Prices per bag and per bbl., without bags, net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.	84¼	3.37
Atlanta, Ga.		2.35
Baltimore, Md.		2.15‡@2.25
Birmingham, Ala.		2.10
Boston, Mass.	.68¼	2.13@2.73
Buffalo, N. Y.	.62½	2.00‡@2.50
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa		2.24
Charleston, S. C.		2.35
Cheyenne, Wyo.	.64	2.56
Chicago, Ill.	.51¼	2.05
Cincinnati, Ohio		2.22
Cleveland, Ohio		2.24
Columbus, Ohio		2.22
Dallas, Texas		2.00
Davenport, Iowa		2.24
Dayton, Ohio		2.24
Denver, Colo.	.63¾	2.55
Des Moines, Iowa		2.05
Detroit, Mich.		1.90
Duluth, Minn.		2.04
Houston, Texas		2.00
Indianapolis, Ind.	.54¾	2.19
Jackson, Miss.		2.02
Jacksonville, Fla.		2.20
Jersey City, N. J.		2.03‡@2.13
Kansas City, Mo.		1.92
Los Angeles, Calif.	.60	2.40
Louisville, Ky.	.55½	2.22
Memphis, Tenn.		2.04
Milwaukee, Wis.		2.20
Minneapolis, Minn.		2.12@2.22
Montreal, Que.		1.60
New Orleans, La.		2.07
New York, N. Y.	.60¾	1.93‡@2.43
Norfolk, Va.		2.07
Oklahoma City, Okla.		2.46
Omaha, Neb.		2.36
Peoria, Ill.		2.22
Philadelphia, Penn.		2.11‡@2.21
Phoenix, Ariz.		3.26
Pittsburgh, Penn.		2.04
Portland, Colo.		2.80
Portland, Ore.		2.40‡@2.60
Reno, Nev.		2.91
Richmond, Va.		2.24‡@2.40
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.		2.21
Savannah, Ga.		2.50
St. Louis, Mo.		1.95
St. Paul, Minn.		2.12@2.22
Seattle, Wash.		2.40
Tampa, Fla.		2.25
Toledo, Ohio		2.20
Topeka, Kan.		2.41
Tulsa, Okla.		2.33
Wheeling, W. Va.		2.12
Winston-Salem, N. C.		2.29

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Albany, N. Y.	.43¾	1.75
Bellingham, Wash.		2.10
Buffington, Ind.		1.80
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.45*
Hannibal, Mo.		1.90
Hudson, N. Y.		1.75
Leeds, Ala.		1.65
Lime and Oswego, Ore.		2.50‡
Mildred, Kan.		2.35
Nazareth, Penn.		2.15
Northampton, Penn.		1.75
Richard City, Tenn.		2.05
Steelton, Minn.		1.85
Toledo, Ohio		2.20
Universal, Penn.		1.80

NOTE—Add 40c per bbl. for bags.
*Includes sacks. ‡10c discount, 15 days.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F.O.B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	Gauging White	Plaster Sanded	Cement Keene's	Finish Trowel	—Plaster Board— ⅜x32x 36". Per M Sq. Ft.	⅜x32x 36". Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lengths 6'-10'. Per M Sq. Ft.
Acme, Tex.	1.70	4.00	4.00	4.00	4.00	4.50	.....	.....	.....	.....	.....	15.00	20.00
Arden, Nev., and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	.....	.....	.....	.....	11.70u	.....	.....	.....
Blue Rapids, Kan.	1.70	4.00	.....	.....	.....	.....	10.00	.....	.....	.....	.....	15.00	20.00
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50	.....	.....	13.50	.....	.....	.....
Des Moines, Iowa	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	.....	.....	.....	.....	14.30o	12.30m	.....	m9.00@11.00o	.....	.....	.....	.....	.....
Delawanna, N. J.	.....	.....	.....	.....	.....	.....	.....	7.25	.....	.....	13.00	14.00	.....
Douglas, Ariz.	.....	.....	6.00	14.50	15.00	.....	18.00	.....	30.00	.....	.....	.....	.....
Fort Dodge, Iowa	1.70	4.00	6.00	9.00	9.00	9.50	.....	.....	.....	19.00	.....	15.00	20.00
Grand Rapids, Mich.	2.65	4.00	6.00	6.00	9.00	9.00	17.65	.....	22.75	19.00	12.00	15.00	18.00
Gypsum, Ohio	1.70@3.00	4.00	6.00	7.00@9.00	9.00	9.00	19.00	7.00	24.50	19.00	.....	15.00	20.00@25.00
Los Angeles, Calif.	.....	7.50@9.00	7.50@9.00	.....	11.50@13.50	.....	.....	.....	.....	.....	.....	.....	.....
Medicine Lodge, Kan.	1.70	4.00	.....	.....	.....	.....	.....	.....	15.00	.....	.....	15.00	20.00
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	9.00	13.40	14.40	———	15.40	———	———	———	———	———	———
Seattle, Wash. (b)	6.00	10.00	10.00	12.00	13.00	.....	.....	.....	.....	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	21.50	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable). (a) Hardwall plaster, 13.00; casting, finishing, molding, 14.00.
(b) Calacoustic plaster 10.00 at mill; (m) includes paper bags; (o) includes jute sacks; (u) includes sacks.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City or shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	.....	.....
Cement City, Mich.		5x8x12—55.00¶	
Chicago District	200.00¶	.....	.....
Columbus, Ohio	16.00	.....	.....
Detroit, Mich.	.15@ .17†	.....	.24@.26†
Forest Park, Ill.	21.00*	.....	.....
Grand Rapids, Mich.	15.00*	.....	.....
Graettinger, Iowa	.16@ .18	.....	.....
Indianapolis, Ind.	.10@ .12a	.....	.....
Los Angeles, Calif.	4x8x12—5.00*	4x6x12—4.20*	
Olivia and Mankato, Minn.	9.50b	.....	.....
Somerset, Penn.	.18@ .20	.....	.....
Tiskilwa, Ill.	.16@ .18†	.....	.....
Yakima, Wash.	20.00*	.....	.....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton. (c) Plain. (d) 5x8x12—65.00 M, 5½x8x12—68.50 M.

Cement Roofing Tile

Prices are net per square, carload lots, f.o.b. nearest shipping point, unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.	
Red	15.00
Green	18.00
Chicago, Ill.—Per sq.	20.00
Detroit, Mich.—5x8x12, per M	67.50
Houston, Texas—Roofing Tile, per sq.	25.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Waco, Texas:	Per sq.
4x4	.60

Cement Building Tile

Cement City, Mich.:	Per 100
5x8x12	5.00
Chicago District (Haydite):	
4x 8x16, per M	140.00
8x 8x16, per M	220.00
8x12x16, per M	300.00
Columbus, Ohio:	
5x8x12	6.50
Detroit, Mich.:	
5½x8x12, per M	75.00
Grand Rapids, Mich.:	
5x8x12	8.00
Longview, Wash.:	
4x6x12	5.00
4x8x12	6.25
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Houston, Texas:	
5x8x12 (Lightweight)	80.00
	Per 100
Pasadena, Calif. (Stone Tile):	Per 100
3½x4x12	3.00
3½x6x12	4.00
3½x8x12	5.50
Tiskilwa, Ill.:	Per 100
8x8	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile):	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.:	
5x8x12	82.00
5x4x12	46.00
5x8x 6 (half-tile)	41.00
5x8x10 (fractional)	82.00
	Each
Yakima, Wash. (Building Tile):	
5x8x12	.10

Cement Drain Tile

Graettinger, Iowa.—Drain tile, per foot: 5-in., .04½; 6-in., .05½; 8-in., .09; 10-in., .13; 12-in., .17½; 14-in., .25; 16-in., .32; 18-in., .40; 20-in., .50; 24-in., .80; 26-in., 1.00; 28-in., 1.10; 30-in.	1.25
Longview, Wash.—Drain tile, per foot: 3-in., .05; 4-in., .06; 6-in., .10; 8-in., .15; 10-in.	.20
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile, per M:	
3 in.	40.00
4 in.	50.00
6 in.	75.00
8 in.	100.00
Waukesha, Wis.—Drain tile, per ton	8.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	.....
Chicago District	16.00	.....
Columbus, Ohio	16.00	17.00
El Paso, Tex. — Clinker	13.00	13.00
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Forest Park, Ill.	.....	37.00
Friesland, Wis.	22.00	32.00
Longview, Wash.*	15.00	22.50@65.00
Milwaukee, Wis.	14.00	32.00
Mt. Pleasant, N. Y.	.....	14.00@ 23.00
Omaha, Neb.	18.00	30.00@ 40.00
Pasadena, Calif.	10.00	.....
Philadelphia, Penn.	14.75	16.50@ 20.00
Portland, Ore.	17.50	23.00@ 55.00
Mantel brick—100.00@150.00		
Prairie du Chien, Wis.	14.00	22.00@ 25.00
Rapid City, S. D.	18.00	30.00@ 35.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

*40% off List.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.								15.00 per ton									
Detroit, Mich. (c)																	
Sewer	.10	.12	.22	.30	.40	.60	.90	1.20	.....	1.75	2.00	2.50	3.30	4.50	5.75	6.50	8.00
Culvert	.....	.....	.....	.....	.95	1.25	1.60	.....	.....	2.25	2.50	3.00	3.50	5.00	6.50	8.00	10.00
Grand Rapids, Mich.	4 in. to 12 in., 72% off standard sewer price list; 15 in., 65% off; 18 in. to 24 in., 62% off; 27 in. to 36 in., 60% off																
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	1.70†	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.75	.85	.90	1.15	.....	.....	1.60	.....	2.50	.....	.....	.....	.....	.....
Longview, Wash.	Sewer pipe 40% off list; culvert—list																
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.	6 in. to 24 in., $18.00 per ton																
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Olivia, Mankato, Minn.	12.00 per ton																
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tiskilwa, Ill. (rein.)	.....	.....	.....	.75	.85	.95	.70	1.55	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tacoma, Wash.	.15	.17	.22½	.30	.40	.55	1.20	1.70	.....	2.00	.....	2.75	3.40	.....	6.50	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	1.00	1.13	1.10	1.60	.....	1.90	.....	2.25	3.40	.....	5.50	.....	.....
Yakima, Wash.	.....	.....	.....	.....	.....	.....	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78

(a) 24-in. lengths. (b) Reinforced. (c) Delivered on job; 5% discount, 10th of month. †21-in. diam. ‡Price per 2-ft. length.

Recent Contract Prices for Rock Products

CONTRACTS recently let on bids received for rock products are as follows:

Rockford, Ill.—The board of supervisors approved a contract with the Consumers Co., of South Beloit, Ill., to furnish gravel at 20 cents per ton for county road work during the present season.

Eugene, Ore.—Igoe and Foster were awarded the contract to quarry rock at the three county quarries at Indian creek, Horton, and Deadwood creek, on a bid of 95 cents a cu. yd.

Greenville, Texas.—The city council approved a contract to the James Stone Co. of Corsicana, Texas, for 6000 yd. of rock for rip rap for city reservoirs. The bid was $2.13 at the city's railroad switch. Another bid was from Alvin Simpson of Avinger, Texas, for stone at $1.37 per ton f.o.b. Avinger, with freight rates to Greenville of $1.05.

Bluffton, Ind.—County commissioners awarded to E. T. Cole a contract to supply the county with 10,000 cu. yd. of gravel at 53 cents per yd.

Marquette Cement Company Using Quarry Stripping

WHILE the Marquette Cement Mfg. Co. has been carrying on its process of stripping the soil away from a plot of 32 acres west of Highway 61 in South Cape Girardeau, Mo., it is building up low land along the Mississippi river on the east side of the highway.

Since the Marquette company has been in operation it has removed more than 2,000,000 cu. yd. of the soil from its holdings by hydraulic stripping. A 125-acre plot south of the plant is being built up.

The company recently took over the tract known as the Marquette Guernsey farm and is now stripping that property. In some places the quarry has been penetrated to a depth of more than 200 ft., while tests have revealed that the rock is good for 900 ft. or more. It has been estimated by officials of the company that the rock supply at that place is good for more than 100 years.—*Cape Girardeau* (Mo.) *Missourian.*

Alton J. Blank in New Location

ALTON J. BLANK, effective August 1, becomes general superintendent and supervising chemist of the Compania de Cemento Portland "Landa," Puebla, Puebla, Mexico. He has been chief chemist of "La Tolteca" Compania de Cemento Portland, S. A. Tolteca, Hidalgo, Mexico.

Mr. Blank is a son of John A. Blank, general superintendent of the Superior Portland Cement Co., Superior, Ohio, and was formerly assistant chemist, and acting chief chemist of the Georgia Cement and Stone Co. and later assistant chief chemist of the Phoenix Portland Cement Co. at Birmingham, Ala. He has many friends in the United States who will join with ROCK PRODUCTS in good wishes for him in his new position with larger responsibilities.

Ideal Cement Co. Announces Plans for Arkansas Plant

FINAL details in connection with the construction of the Ideal Cement Co.'s new Arkansas Portland Cement Co.'s plant were announced recently in a program involving the expenditure by the company of more than $2,000,000. A site for the plant has been selected in Howard county, about five miles south of the town of Schaal and close to the Texas border, giving the company an outlet for its product in both states.

The preliminary step in the program has already been carried out, it was announced. This consisted of the purchase of the Grayson, Nashville and Ashdown railroad, running from Ashdown, about 60 miles northeast, in the town of Shawmut, where it connects with the Kansas City Southern and the St. Louis-San Francisco main lines. The Missouri Pacific main line runs through Ashdown.

The next step will consist of the construction of a five-mile branch line from Schall to the plant site. Bids have already been received for this construction and it is estimated that only about 90 days will be required for the completion of the work after the contract has been let. In the meantime a village and company office for the employes will be constructed at the plant site.

As soon as the railroad has been completed, actual construction will commence on the plant itself and the company's engineers are working out the final designs in the local offices in order to have them ready in ample time. Contracts were let on July 9 for all the necessary machinery to be used in the factory. It is expected that the plant will be turning out cement early next summer.

Power for the new plant, which will have a capacity of 2,000,000 bbl. of cement, will be purchased by the company rather than to undertake the erection of its own power unit. Natural gas will be used.

The cement deposit that is located near the factory site is said by officials to be of excellent quality, turning out an unusually high grade finished product. The company is assured of an immediate market for its production by the $50,000,000 road building program recently adopted by the state of Arkansas, as well as by the rapid expansion in the neighboring state of Texas.

The company is well able to carry out the project without resorting to public financing and no new securities will be issued, other than those involved in the refunding plan to be completed in July.

D. S. McBride Made Vice-President of Lone Star Cement

A FEW YEARS ago (about four) D. S. MacBride was district engineer of the Portland Cement Association at Philadelphia, Penn. On July 1 he returned there to make his home and headquarters as vice-president of the Lone Star Cement Co., the subsidiary of the International Cement Corp., which operates the former Phoenix Portland Cement Co. plant at Nazareth, Penn. He will be general manager of the International's interests in Philadelphia and eastern Pennsylvania territory.

D. S. MacBride

General Cement Corporation Project Abandoned

CONSOLIDATION of this corporation and the Pennsylvania-Dixie Cement Corp. has gone by the board, it was definitely announced on July 2. Frederick W. Kelley, president of the North American company, said no further steps will be taken to bring the concerns together under the name of the General Cement Corp.

"The whole proposition must be looked upon now as an experience," Mr. Kelley said. "We as the directors and servants of the stockholders did what we could to bring the merger about and we had the support of an overwhelming majority of the stock. It had been agreed that a certain percentage of the debenture holders in North American must deposit their holdings with an agreement to accept in exchange preferred stock in the new corporation. When we found the bonds had not been deposited in sufficient number to meet that provision we abandoned the plan."

Asked whether the North American Cement Corp. planned any program "on its own," now that the merger scheme had failed, Mr. Kelley said there was nothing projected save a steady effort to increase the efficiency of the plants operated by the concern.

The failure of the debenture holders in North American to meet the terms of the merger agreement in sufficient numbers to effect the consolidation relieved an embattled group of preferred stockholders in the corporation of the necessity of carrying farther their legal fight against the terms of the proposal.

This minority group, after obtaining court orders to restrain the directors from completing the consolidation, had decided to drop battling by injunction and adopt another course to force better terms for themselves. —*Albany* (N. Y.) *News and Journal.*

Sturm and Dillard Gravel Plant at Circleville, Ohio, Opens

ONE of the most notable new sand and gravel plants built this year is that of the Sturm and Dillard Co., Circleville, Ohio. It was designed by the Link-Belt Co. and contains several innovations. A local news dispatch, dated July 6, states:

At present the daily output is from 4000 to 5000 tons of gravel per 20-hour-day.

The deposit which it is working on contains approximately 10,000,000 tons of sand and gravel, as near as can be estimated, which assures this industry for Circleville for years to come.

Four months ago the Sturm and Dillard Co., Columbus, Ohio, started building its gravel plant. It has been in operation two months. Five miles of track have been put down and are in operation for storage from the Chesapeake and Ohio and the Norfolk and Western railroads, for ballast loading.

The washer plant is equipped with the latest type machinery known to the gravel industry, including an electric automatic skip hoist, elevating the material to a hopper bin 104 ft. above the ground, at the rate of 400 tons per hour.

To insure the material being free from loam and other foreign matter, the pumps elevate 2500 gal. of water per minute to the screens through which the aggregate passes for sizing.

To reduce large boulders to screened sizes, the plant is equipped with two rock crushers.

Fred J. Scharer

FRED J. SCHARER, vice-president in charge of sales at Kansas City of the Consolidated Cement Corp., died June 27 following an operation for appendicitis.

Mr. Scharer was well known in the industry, as he had been with his company since its organization.

New Machinery and Equipment

New 2-Yd. Convertible Shovel

THE LINK-BELT CO., Chicago, has announced the addition of a 2-yd. shovel to its line of crawler cranes, shovels and draglines. The largest shovel previously built by this company was a 1½-yd. unit. The new machine, which is designated as K-55, is a heavy duty, all-purpose unit, primarily designed for the following adaptations: Shovel with a 30-ft. boom and 18-ft. dipper stick carrying a 2-yd. all-manganese-steel dipper; Dragline to handle 2-yd. dragline bucket for medium and medium-heavy excavating on a 50-ft. boom, or 1½-yd. dragline bucket on a 60-ft. boom; Clamshell bucket of 2-yd. capacity for sand, gravel or materials of equal weight and consistency, on a boom 50 ft. long, or clamshell bucket of 1½-yd. capacity in similar materials on boom of 60 ft., or an equivalent weight of heavier or lighter materials for either bucket; and, finally, as a trench hoe of 2-yd. capacity. All attachments are interchangeable without disturbing the mechanism of the machine proper.

While this unit will find a large field in quarries, sand plants and similar operations, it is also specially adaptable for moveable use, as in contractors work, since a special clearance reducing arrangement permits it to be shipped without dismantling. Special treads, easily substituted, and other features, bring the unit within the railroad requirements of 10 ft. 4 in. overall width and 16 ft. overall height for shipping, the manufacturers state.

The shovel has unit cast steel construction of lower and upper frames, self-cleaning crawler treads, large bronze-bushed crawler rollers, enclosed cut gearing and bronze-bushed bearings throughout. New features of the unit include internal expanding friction clutches of large size, the main drum being 42 in. in diameter and the swing and travel clutches 30 in. in diameter, also an adjustable center pin 13½ in. in diameter, which can be removed as a unit with the vertical travel shaft assembly without removing any other parts, and large brake drums 48 in. in diameter and 5 in. wide. Drums have renewable cast steel shells, and have an air space between clutch and brake surfaces for rapid cooling. The machine is 12 ft. wide overall at the lower frame, and the crawler treads are 36 in. wide. It is built to be driven by a gasoline engine, electric motor or Diesel engine.

New 2-yd. convertible shovel being used as a dragline

New Slurry Agitator

A NEW slurry agitator, known as the "Venturex," has been announced by Smith and Smith, mechanical engineers of Lakewood, Ohio. The principle used is a circulatory system within the tank through the medium of an internal, submerged cylindrical shell, which in this case is a Venturi tube in place of a regular cylinder. In the throat of the tube is a power driven propeller, and the Venturi form is much modified in its lower portion, which consists of a cast iron casing for the propeller bolted to the bottom of the tank. The upper cone is of sheet steel construction stiffened by cast iron rings at either end, the lower of which has guide lugs engaging with guide studs in the fixed base. The upper ring is guided by a tube fixed and projecting into the tank from above. The movement of this sheet steel cone gives the effect of a valve opening directly above the propeller, and is useful only at the times of filling and emptying the tank. Annular slots in this steel cone

New type of slurry agitator ready for installation

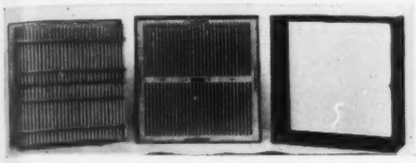
arranged at the proper heights combine the functions of mixing channels, by reason of the extra currents developed in regular operation. They also serve to maintain the slurry level inside and outside of the Venturi tube when filling the tank or when discharging its contents. The steel cone is raised or lowered by hand or power.

It is claimed that this agitator is fully self-cleaning. The current of slurry is propelled downward and then flares outward like an inverted mushroom. This current sweeps the floor and the lower walls of the tank, and its high velocity, induced by the propeller, keeps the slurry from depositing. There are no scrapers, plows or similar means to keep the agitator free. It is claimed that the Venturex mixes more quickly and does a more thorough job than the usual agitator. Each unit is designed particularly for the individual plant.

New Air Filter for Pipe Lines

THE Staynew Filter Corp., Rochester, N. Y., have placed on the market a new air filter known as the "Protectomotor." It is claimed that when this new filter is placed in the air lines it will remove dust, water, oil, rust, scale and other foreign matter from air passing through pipes and prevent wear and damage caused thereby. The filter consists of an aluminum housing enclosed in a steel housing, which the manufacturers claim will withstand a working pressure of 125 lb. The filter mounted inside consists of a felt filter medium formed in pockets over radial wire screen fins grouped around a central

outlet. This permits mounting a relatively large area of felt in a compact space and allows the use of the entire available area of felt with a negligible restriction. The large capacity inserts are designed to pass 250 cu. ft. of free air per minute and contain 20 sq. ft. of felt within a volume slightly smaller than a cubic foot.



Panel filter unit, center, showing the panel, left, and the frame, right

As air enters the top of these filters, it is thrown against the inner wall of steel housing by a shield over the top of filter. The downward velocity carries water, oil and most of the grit to the bottom of the shell. All remaining water, oil, dust and grit is claimed to be caught by the filter. A drain cock is provided at the bottom to remove water, oil and sediment.

By closing a valve to shut off air going into the filter housing and opening the drain cock, the air in the outlet pipes or hose is blown back through the filter proper, removing all material on the filter surface. The manufacturers claim that this filter can in this way be cleaned in about 10 minutes while in operation and that cleaning is necessary but twice a year under ordinary conditions. No oil drain or cleaning tanks are necessary, and the filter does not have to be removed when once in operation.

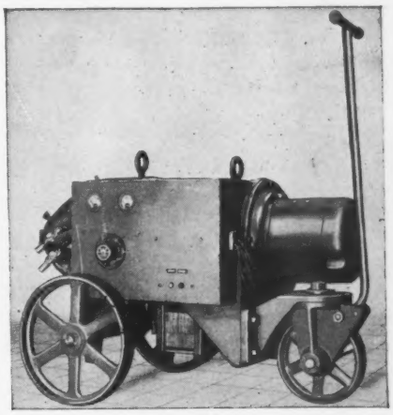
The company states that in a test made at the University of California, a filtration efficiency of 99.9% was obtained with this filter, when a standard dust, 98.6% of which passed through 200-mesh, was used.

New 200-Amp. Arc-Welder

A NEW 200-amp., single-operator welding set has been designed by the Westinghouse Electric and Manufacturing Co. for use in both the shop and field. The new unit is claimed to be outstanding in its features of simplicity of operation and compactness.

The unit is rated at 200-amp., 1 hour, 50 deg. rise on a resistance load at 25 volts, which conforms to the standard rating of the National Electrical Manufacturers Association. The motor is wound for 220 or 440 volts and is assembled with the necessary connections made for operation from a 3-phase, 60-cycle circuit. If it is desired to operate the unit from a 440-volt, 3-phase, 60-cycle circuit, it is only necessary to replace the operating coil on the magnetic starter, and to reconnect the motor leads, according to the manufacturer.

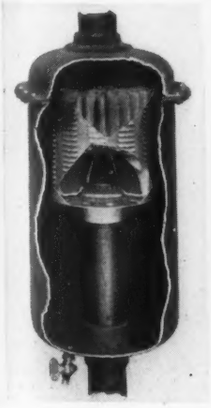
The constant current motor-generator and control equipment are assembled in a totally enclosed frame. The exciter, which is overhung from the motor end, is securely fastened to the unit frame. This type of construction guard is designed to protect the operator against injury, and the set from dirt and falling objects. In performance tests, according to the company's claims, welding operations have been carried on while the sets were suspended at every angle that could possibly be required in any application, and the operation was satisfactory even when the set is placed on end.



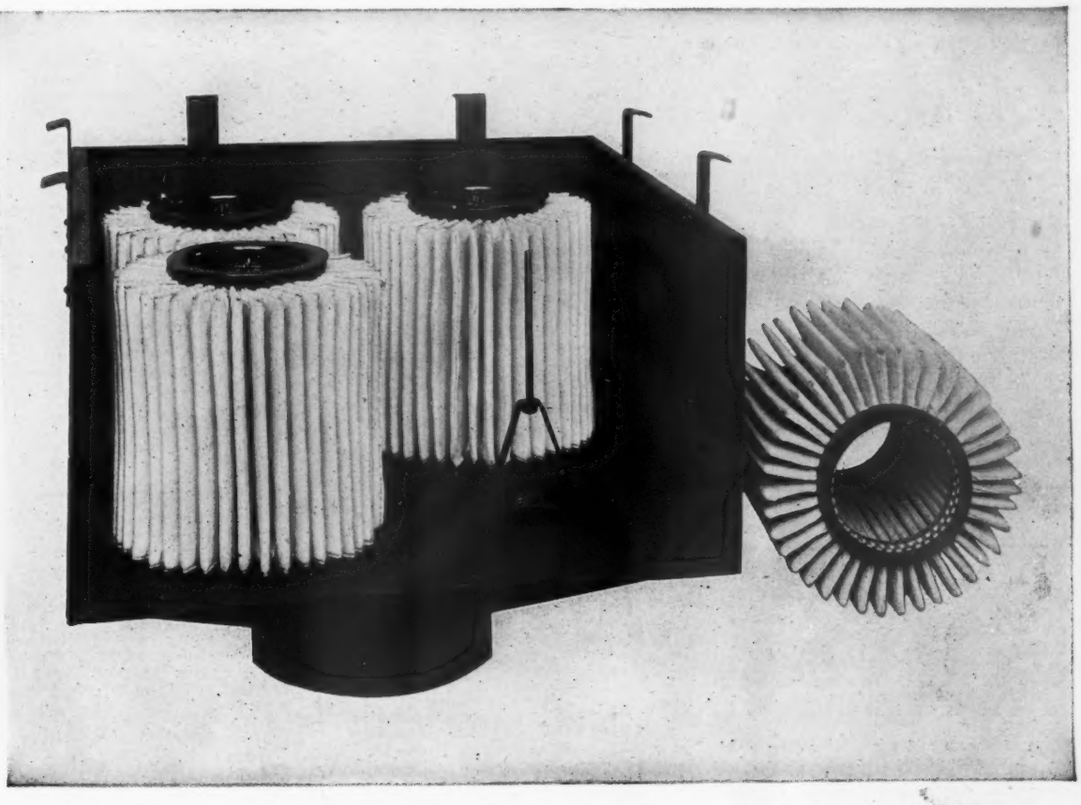
Portable arc-welder

The set is started by connecting directly across the line by means of a linestarter and linestart motor. A single rheostat varies the arc current over the entire welding range from 60-amp. to 300-amp. and accurate adjustment is afforded by steps of 5-amp.

Filter unit for installation in a pipe line



Sectional view of pipe line filter



New 1000 C.F.M. upright air filter with top and side plate removed showing the four filter units

News of All the Industry

Incorporations

Superior Lime Co., Fairmont, W. Va., $50,000. Ira A. Adkins.

Fincke Cement Process Co., Delaware, $26,000. Artificial stone.

Chicago Fluorspar Co., Chicago, Ill., $50,000 to $10,000, capital reduced.

Alexandria Gravel Co., Alexandria, La., $80,000. J. C. Roxadale, J. N. Weil.

National Lime, Cement and Byproducts Corp., New York City, a Delaware corporation.

North Jersey Sand and Stone Co., Spring Lake, N. J., 150,000 shares, common, no par value.

Camden Cement Products Co., Camden, Ohio, $50,000. F. C. Rosche, J. W. Driskill, J. W. Matthews.

Glen Allen Sand Co., Walker county, Montgomery, Ala., $3000. R. G. Wheeler, Cad Jones, Monroe Jones.

Nitrate Corporation of America, Marfa, Tex., $500,000. Nitrate of soda and potash. A. A. Snell, manager.

Smoky Mountain Sand Co., Knoxville, Tenn., $50,000. Ben Catlett, J. L. Greer, E. L. Walker, A. L. Reynolds.

Fort Worth Concrete Tile Co., Fort Worth, Tex., $15,000. S. C. Cunningham, 709 N. Main St., Fort Worth.

Ready Built Products Co., Farmingdale, Queensboro, New York City, $10,000. F. C. Wardin. Cement products.

Delaware Sand and Gravel Co., Muncie, Ind., has filed papers increasing its capital stock from $10,000 to $75,000.

Colgrove Sand and Gravel Co., Portsmouth, Ohio, $10,000. C. L. Corkwell, R. C. Larimer, William J. Colgrove.

Avon Mountain Quarries, Inc., Hartford, Conn., $100,000. Louis Toffolon, 1097 W. Main St., New Britain, Conn., and others.

Copiague Concrete Products Co., 11 W. 42nd St., New York City, 200 shares common, no par value.

Grant Gravel Co., Pollock, Grant Parish, La., $8,000. John A. Cook, Pollock, La.; H. M. Price, Tullos, La.; Louis Tullos, Tullos, La.

Poccasset Granite Co., Providence, R. I., 500 shares, no par value. Jos. Bastianon, 99 Pocasset Ave., Providence; A. Bastianon, Fergus J. McOsker.

Lime Products Co., Milwaukee, Wis., 350 shares, common, par value $100; 150 shares, preferred, par value $100. E. A. Siegert, B. F. Siegert, H. L. Mount.

Co-operative Sand Co., Newark, N. J., $100,000 preferred stock, 2500 shares common, no par value. John Decker, West Orange, N. J.; William H. Vidor, Maplewood, N. J.; George Smith, Caldwell, N. J.

General Building Products Co., Biltmore, N. C., $100,000. Ralph W. Howell, Hayden Grindstaff, S. G. Bernard, Asheville, N. C. To manufacture, buy and sell granite, marble, stone, plaster and all building products.

Ottawa Sands Corp., 111 W. Monroe St., Chicago, Ill., $500,000. Hiram A. Cooley, Arthur B. Hewson, John A. Balks; correspondent, John Gutknecht, 111 W. Monroe St., Chicago. To manufacture, mine, buy, sell, produce and refine sand, clay, etc.

Quarries

L. H. Gault and son of Westport, Conn., have purchased a new rock crusher which is now being installed on their property south of Ball Mountain on Imperial Ave. This crusher is capable of an output of 200 cu. yd. a day.

Capital Granite Co., Blairs, S. C., noted in the June 9 issue of ROCK PRODUCTS, p. 80, is another of the Robt. G. Lassiter, Oxford, N. C., enterprises. A 40-car capacity crushing plant is under construction; it is to be electrically operated throughout.

Bertram Brown and son, Harry Brown, of Kansas City, owners of the Nettleton onyx mines near Peace Valley, Mo., recently spent a few days looking over the mines. They were accompanied by A. E. Bettis, vice-president of the Kansas City Power and Light Co., who is a representative of the industrial division of the Kansas City Chamber of Commerce, to look over the onyx fields as a development project.

Sunbeam Quarries Co., Louisville, Ky., has been recently formed by J. B. Beam and L. B. Beam of Bardstown, Ky., and will be incorporated within a short time, according to a recent report. It is planned to open a quarry in Bullet county, just south of Louisville, and to operate yards in that city. Highway material, agstone, railroad ballast, and stone for concrete work will be produced, and the plant will have a capacity of 1500 tons daily.

Sand and Gravel

Harbor Sand and Gravel Co., Aberdeen, Wash., has completed a new office building.

Shaw Bros. are dismantling their gravel plant south of Millville, near Hamilton, Ohio, and will remove it to Okeana, Ohio.

Pioneer Sand Co., St. Joseph, Mo., has received a contract for 60,000 tons of sand and gravel for the new Quaker Oats Co. mill at St. Joseph.

Du Page Sand and Gravel Co., between West Chicago and Warrenville, Ill., suffered some loss (about $1,000) from the dynamiting of some of its equipment.

Harbor Dredging Co., Raymond, Wash., has purchased the S. L. Dennis sand and gravel plant at the Narrows. Preparations are being made to ship the output by truck and barge.

Pacific Sand and Gravel Co., New Westminster, B. C., is constructing a new set of bunkers which will have a capacity of approximately 100 cu. yd. A new vibrating screen is also being installed.

Ross Island Sand and Gravel Co., Portland, Ore., elected the following board of directors at its meeting recently: D. L. Carpenter, W. H. Murhead, Charles Swigert, E. C. Nelson, Harold Blake, Aaron Holtz, W. G. Brown, P. L. Tales and Russell Hawkins.

North Jersey Sand and Stone Co., with home offices at Spring Lake, N. J., has purchased the Warren Sand and Gravel Co. of Carpentersville, N. J., and plans to double the washed sand and gravel production of that concern, which has been 100,000 tons annually.

O'Rourke Construction Co. of Des Moines, Iowa, which is paving federal highway No. 55 out of Calmar, has leased the gravel and sand pit southeast of the fair grounds in Decorah. The lease is for a period of five years. A considerable part of the sand and gravel will be used in paving federal highway No. 55 between Ossian and Decorah. The leased land contains 20 acres.

Construction Materials Co., Chicago, Ill., sand and gravel producers, has purchased from the R. F. Conway Co. a material yard with an area of 193,000 sq. ft., fronting 495 ft. in Calumet Harbor, South Chicago, 80 ft. southwest of Ewing Ave., extending an average of 350 ft. to the Calumet river, where there is a frontage of 395 ft., served by the Belt Line railroad. The stated consideration was $135,000.

C. M. Johnston and Sons Sand and Gravel Co. will open a branch in West Helena, Ark., about September 1, C. M. Johnston announced. The storehouse and display rooms and offices will be erected at an approximate cost of $25,000, the buildings to be constructed of fireproof reinforced concrete. The branch will handle general builders' supplies, sand and gravel, and coal. The warehouse will be 100x30 ft. and the display rooms and offices will be 112x36 ft. The site of the structure is between the Humboldt canning plant and the Missouri-Pacific freight depot on the south side of Plaza St. in West Helena.

American Aggregates Corp. (Greenville Gravel Co.), Columbus, Ohio, made a proposal to exchange 24 acres of land, adjoining the municipal golf course, for seven acres owned by the city. The offer was rejected by city council. The land which the company desired to trade to the city is composed of a large pit from which gravel has been removed. It is estimated by the city that had the trade been consummated it would have required two years to replace the golf course to its present status and would have cost between $7,000 and $10,000. Recreation Director Arthur W. Raymond told council that the golf course is earning approximately $18,000 a year in green fees.

Dorman-Kampe Co., Vancouver, Wash., is experiencing a busy season at its sand and gravel plant on the river road east of the barracks. The growing demand for their "ready-mixed" concrete has really been beyond expectations, and is proving to be quite a popular feature among Vancouver builders. The company is furnishing concrete materials to nearly all the better residences in the city, besides many of the larger buildings such as the McCready building, the Junior high school, the Andresen building at Eighth and Washington Sts., and the new $85,000 apartment building on Seventh and Reserve Sts. The company is continually making improvements on its plant and is adding new features in order to supply the best possible materials obtainable, and is endeavoring to keep abreast of the builders' needs in every way.

Cement

Monolith Portland Midwest Co., Laramie, Wyo., has mounted its 10 x 11 ft. 3 in. x 341 ft. kiln. It has five pairs of single-roll supports.

Commonwealth Portland Cement Corp., Pownal, Vt., plans to have new mill in operation by fall; to cost $1,500,000 and have a capacity of 1,150,000 bbl. per year.

Kentucky—Some 38 towns and cities in Kentucky are bidding for the new cement plant announced some weeks ago to be built by F. B. Drew, McAlister, Okla., and associates. Leigh Hunt, Hunt Engineering Co., Kansas City, Mo., is engineer.

Beaver Portland Cement Co., Gold Hill, Ore., plant, which has been partly closed down the past six weeks, started fire in its kiln July 1 and resumed production in entire plant, as well as its local and Marble Mountain quarries. The resumption increases the company's crews from 25 men to 125. Present conditions of the sale of cement indicate that the plant will operate to full capacity to the first of the year.

Sandusky Cement Co., York, Penn., has purchased from the Cooper Manufacturing Co., York, 50 acres of land in Hellam township. The tract is located along the Pennsylvania railroad not far from the borough of Hallam. It adjoins a tract bought some time ago on the opposite side of the railroad by the cement company. The consideration was $15,000. The cement company also has bought a tract from Helen K. McNeeley for $3,000.

Oregon Portland Cement Co., Portland, Ore., has let the contract for its new building to the Hansen-Hammond Co., general contractors, according to L. C. Newlands, vice-president and general manager of the cement company. The first two floors of the new building will be used for warehouse purposes and the third floor will be for offices. The interior and exterior finish will be of cement with cast-stone trim, demonstrating the use of cement as a building material, in the same manner as was done with the offices of the Portland Cement Association in Chicago.

Superior Cement Co. plant of the Wellston Iron Furnace Co., Jackson, Ohio: some departments of the plant ceased operations July 1, according to an announcement in Ironton (Ohio) papers by J. A. Blank, general superintendent. Approximately two-thirds of the 225 men employed at the plant will be unemployed. The increased amount of production during the past several months, coupled with the general industrial depression throughout the country, was given as the principal reason for the partial shutdown. The shipping department will continue with a full force, as will the cement grinding department and the complete "Wifco" departments. The popularity of "Wifco," the colored cement product introduced by the Lawrence county plant, has steadily increased since being placed on the market, and regardless of slack business conditions "Wifco" is enjoying steady increase in sales.

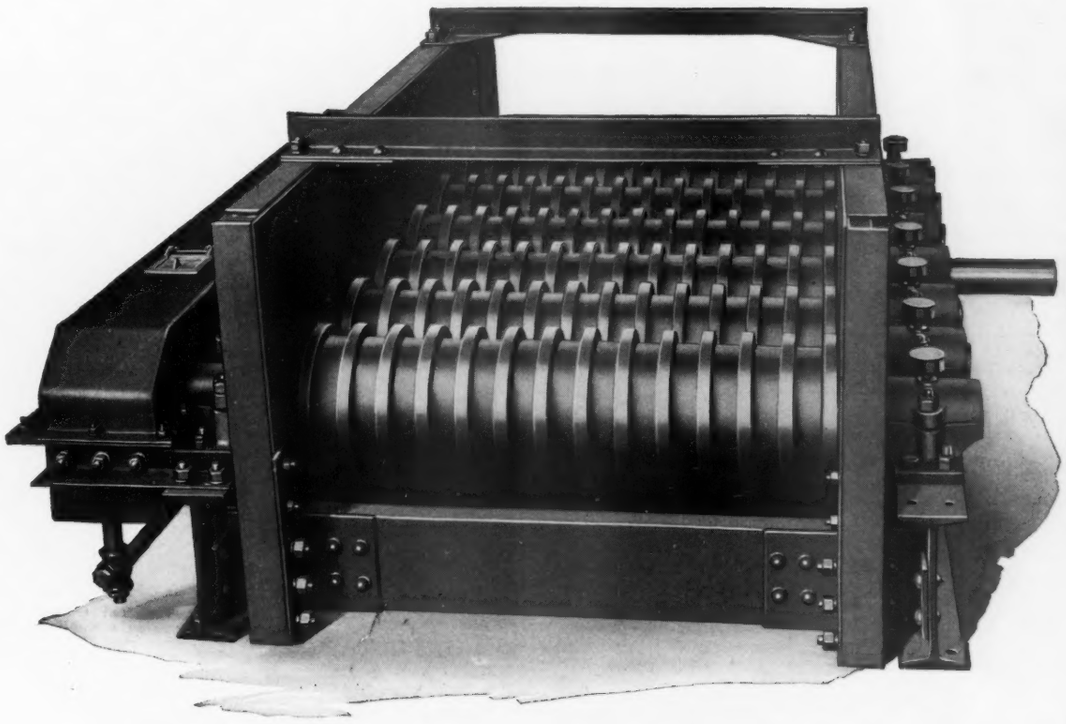
Cement Products

W. W. Frederick and John Bowers, both of Coshocton, Ohio, are establishing a cement block plant on the Frederick farm near Coshocton.

Artificial Stone and Tile Co., Wilmington, Del., has received the contract to furnish all the tile work in a development of 52 new homes which are to be erected in that city by a Philadelphia concern.

Stone-Tile and Supply Co., South Knoxville, Tenn., is carrying on a large expansion program, including the installation of a new electric mixer and other machinery which will bring the plant capacity up to 12,000 tiles daily, according to Bernard Wilkins, president of the concern.

Central Mortar and Supply Co., Huntington, W. Va., has opened a new concrete mixing plant, the only one of its kind in the vicinity. L. A. Woolcott, president and general manager of the



Multi-Roll Sizers

PRODUCTS:

Crushing Machinery
Cement Machinery
Mining Machinery
Metallurgical Machinery
Electrical Machinery
Gas Engines
Steam Engines
Steam Turbines
Condensers
Oil Engines
Hydraulic Turbines
Pumping Engines
Centrifugal Pumps
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Steam and Electric Hoists
Farm Tractors
Power Transmission Machinery

Allis-Chalmers Multi-Roll Sizers are built in a wide range of sizes and capacities. They are of heavy construction and self-contained on structural steel frames. The driving mechanism is enclosed in a dust and oil proof housing. It operates in a bath of oil that is being constantly renewed by a simple and positive oiling system. The Multi-Rolls operate at differential speeds, giving a rapid segregation of the material and consequent high capacity with minimum power and maintenance.

Allis-Chalmers also manufactures a complete line of Revolving Screens for every service

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

company, stated that the decision to open the plant was reached because of the success of the company's ready-mixed mortar plant which has been in operation for four years.

Lime

Independent Lime and Stone Co., Port Washington, Wis., recently filed a petition in bankruptcy.

Diamond Springs Lime Co., Diamond Springs, El Dorado county, California, announces the removal of its principal place of business to Auburn, Placer county, California.

Western Lime and Cement Co., Grimms, Wis., suffered a loss of from $10,000 to $20,000 recently. The kilns will be rebuilt, according to announcement. Some 800 cords of wood were destroyed as well as the kiln shed.

Gypsum

Ontario Gypsum Co., Elora, Ont., is developing a new section of its mine on the property near Lythmore, Haldimand county, Ont., and equipment is being installed which will use an additional 150 horsepower.

Rock Phosphate

Standard Fertilizer Co., Inc., Williamston, N. C., has begun an expansion program to double approximately present capacity. New machinery will be installed, including bagging equipment, conveying, loading and other handling apparatus. Company is a subsidiary of Standard Wholesale Phosphate Co., Continental Bldg., Baltimore.

Personals

George W. Borden, formerly state highway engineer of Nevada, is acting district sales manager of the Santa Cruz Portland Cement Co. at Stockton, Calif.

H. N. Spicer of the Dorr Co., New York City, accompanied by Mrs. Spicer, has returned from a seven months' trip to Australia, the Federated Malay States, China and Japan, in connection with his company's interest in these countries.

W. P. McGeorge, president of the Pine Bluff Sand and Gravel Co., Pine Bluff, Ark., was one of a committee of local business men recently consulted by the members of the Mississippi River Flood Control Commission on the occasion of the commission's visit to Pine Bluff.

Obituaries

Lawrence Keefe, president of the Northwest Lime Co., Seattle, Wash., died June 23 at his home in Seattle, at the age of 46 years. He was survived by a widow, a daughter and two sons.

Charles M. Saeger, former manager of the Coplay Cement Co., died June 2 at his home in Allentown, Penn., aged 71 years. He was with the Coplay company from 1885 until about 10 years ago, when he retired.

Joseph Lally, cement products manufacturer of Landisville, N. J., was killed at the Central Railroad of New Jersey crossing near his home on June 23. On the same spot two years before, his small daughter had been struck and killed.

Michael Torphy, for many years superintendent of the Carthage Marble and White Lime Co., Carthage, Mo., died June 30 at Bedford, Ind. He went to Carthage many years ago from Bedford. He was a former member of the Carthage city council and also served as street commissioner. He was 70 years old.

Manufacturers

Payne G. West, Detroit, Mich., representative for industrial and contractors equipment, has moved his offices to a new location at 1193 Lawrence Ave., Detroit.

Smith-Emery Co., Los Angeles, Calif., chemists and engineers, announce the establishment of new offices and laboratories at 920 Santee St., Los Angeles, in the company's own building.

Manning, Maxwell and Moore, Inc., New York, have announced the purchase of the American Schaeffer and Budenberg Co. of Brooklyn, N. Y., from Ralph Jonas and his associates. The latter company is one of the oldest and largest manufacturers of industrial instruments in the country, having been founded in 1851. The business of the company will be co-ordinated with that of the Consolidated Ashcroft Hancock Co., Inc., manufacturers of valves, indicating and recording instruments, owned by Manning, Maxwell and Moore, Inc.

G. H. Williams Co., Erie, Penn., manufacturers of clamshell buckets, has appointed Carl F. Weiblen as its Chicago manager, to succeed R. B. Randall, who has accepted the position of Pacific coast manager for the Link-Belt Co. of Chicago. Mr. Weiblen was formerly manager at Cleveland.

National Flue Cleaner Co., Inc., Groveville, N. J., has recently appointed several new southern representatives as follows: Fuel Efficiency Engineering Co., Birmingham, Ala.; A. S. Furtwangler, Charleston, S. C.; Reed and Duecker, Inc., Memphis, Tenn.; Buckmaster-Luck-Malochee, Inc., New Orleans, La., and Henry Eggelhof, Dallas, Texas.

Pierce Governor Co., Anderson, Ind., has completed the transfer of its entire factory and executive offices to its new plant, which was recently acquired from the R. J. Wright Mfg. Co., and completely remodeled. The property comprises four acres, providing ample room for expansion.

New plant of the Pierce Governor Co., Anderson, Ind.

Chicago Pneumatic Tool Co., New York, N. Y., has announced the appointment of W. S. Lynch as district manager at Cincinnati, Ohio, to succeed T. G. Smallwood, who is on a leave of absence because of ill health. Mr. Lynch was formerly district manager at Seattle, Wash., and A. M. Andresen has now been appointed acting district manager at that office.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Theft-proof Lamps. Illustrated bulletin on new theft-proof light bulbs for factories and general use. KULP THEFT-PROOF LAMP CO., Chicago, Ill.

Multi-stage centrifugal pumps. New illustrated catalog of the Cameron line of multi-stage centrifugal pumps. INGERSOLL-RAND CO., New York City.

Oxwelded Industrial Piping. Illustrated bulletin describing methods of construction, repair and maintenance of oxwelded pipe systems. LINDE AIR PRODUCTS CO., New York City.

Pulverators. Bulletin **No. 1467** on stationary and portable pulverators, illustrated with views of the various types and detail drawings. ALLIS-CHALMERS MFG. CO., Milwaukee, Wis.

Renewed Machinery. Illustrated announcement of stocks of used equipment, including kilns, crushers, pulverizers, dryers, rolls and similar equipment. CONSOLIDATED PRODUCTS CO., INC., Newark, N. J.

Bucket Handling Cranes. New and complete catalog of bucket handling cranes giving detailed description of all units and presenting ready reference tables. CLEVELAND CRANE AND ENGINEERING CO., Wickliffe, Ohio.

Lubrication of Compressed Air Machinery. The issue of May, 1928, of "Lubrication," containing an exceptionally complete discussion of the lubrication of various types of compressed air machinery. THE TEXAS COMPANY, New York City.

Wire Rope Slings. Eighty-five-page booklet concerning wire rope slings, fully illustrated with pictures of slings in service in industrial plants, and also with blue print diagrams of the details of construction. JOHN A. ROEBLING'S SONS CO., Trenton, N. J.

Catalog and Engineering Data Book. New general catalog **No. 500**, containing 1088 pages with engineering data and list prices on chain, sprocket, power transmission, and elevating and conveying equipment. Also contains considerable data for which the engineer has use, and is complete in every way. **Link-Belt Shovel News.** The May issue of this publication containing a number of illustrations of the company's equipment performing new and unusual tasks, as well as plain every-day work. LINK-BELT CO., Chicago, Ill.

Industrial Tractors. Illustrated announcement of McCormick-Deering industrial tractors for every type of mobile power job, with pictures of the details of construction and of the tractors at work. INTERNATIONAL HARVESTER CO., Chicago, Ill.

Herringbone Gear Catalog. New 24-page booklet giving a description of an improved method of generating Herringbone gears, and showing tooth forms, dimensions, prices and horsepower tables for open gearing. W. A. JONES FOUNDRY AND MACHINE CO., Chicago, Ill.

Portable Compressors. Bulletin **No. 797** illustrating and describing the complete line of P6-DGL portable, gasoline engine driven, compressors, in sizes from 100 to 310 cu. ft. per minute, and giving details and specifications. CHICAGO PNEUMATIC TOOL CO., New York City.

Gasoline-Operated Locomotive Cranes. Bulletin **No. 56**, containing 16 pages illustrated with pictures of details of gasoline-operated cranes, and views of cranes in operation, together with data on the economy of operation of this equipment. ORTON CRANE AND SHOVEL CO., Chicago, Ill.

Kennedy Products. Bulletin **No. 14** describing equipment used in mining and cement plants, including gyratory crushers, hammer crushers, heavy-duty rolls, slugger rolls, dryers, kilns, tube mills and similar equipment, with complete illustrations. KENNEDY-VAN SAUN MANUFACTURING AND ENGINEERING CORP., New York City.

Insuring dependable properties in grey iron castings. No. 2 of a series of four bulletins on the use of nickel in grey cast iron. Deals with uniform structure in the product. **No. 3** of the same series, detailing claims of increased strength. **No. 4** of the same series, covering claims of increased hardness. INTERNATIONAL NICKEL CO., New York City.

Oxwelding and Cutting Equipment Catalog. Fifty-six-page illustrated catalog of all kinds of equipment for use in oxwelding, cutting, brazing, heating and similar uses. **The Carbic Light.** Illustrated booklet on portable floodlights for use around plants and industrial works, with complete specifications for each type shown. OXWELD ACETYLENE CO., New York City.

New Compressor Catalog. Bulletin **No. 83-J** describing compressors of capacities from 300 to 5100 cu. ft. of free air per minute, fully illustrated, with diagrams, details, pictures and views of installations. Bulletin **No. 83-K** describing small size angle compound compressors, and illustrated with detail pictures and views of installations. SULLIVAN MACHINERY CO., Chicago, Ill.

Gas Shovel Catalog. Thirty-two-page, fully illustrated, catalog on the Byers Master Gas Shovel, with 1¼-yd. bucket, containing complete description with general specifications and detail views. **Revolving Gas Shovel Catalog.** Twenty-four-page, completely illustrated, catalog of the Byers ⅝-yd. Bear Cat full revolving gas shovel, with specifications and detail pictures. BYERS MACHINE CO., Ravenna, Ohio.

Alloy Steel Castings. Forty-two-page illustrated booklet on steel castings containing carbon, chromium, nickel, vanadium manganese, or chrome nickel. **Steel Casting Patterns.** Fifty-four-page fully illustrated booklet concerning patterns of steel with data on the various points to be considered, explanation of terms in use in steel foundry phraseology, and a color-plate showing standard pattern colors. SIVYER STEEL CASTING CO., Milwaukee, Wis.

Insulation of Breechings and Stacks. Bulletin **No. 141** giving specifications covering the lining of breeches and stacks on the inside of the steel with "Sil-O-Cel" standard brick. **Filter Aids.** Bulletin **No. 219** covering the subject of filtration, particularly "clarification" filtration, where the impurities removed are slimy or colloidal, and hence difficult to remove. CELITE PRODUCTS CO., Los Angeles, Calif.

Oil Engines. Bulletin **No. 362** on new and used oil engines, and oil engine driven generators. **Industrial Equipment.** Bulletin **No. 364** on all types of equipment, including locomotive cranes, shovels, drag lines, locomotives, rail equipment, etc. **Steel Piling Bulletin No. 367** on new and used steel piling and also other equipment including oil engines, boilers, cranes, and locomotives. WALTER A. ZELNICKER SUPPLY CO., St. Louis, Mo.

G. E. Bulletins. GEA-166A. Alternating current crane and hoist motors. **GEA-403A.** Drum-type switches for throwing A.C. and D.C. motors across the line. **GEA-457A.** Squirrel-cage induction motors with riveted frames. **GEA-753A.** Shoe-type solenoid brakes for A.C. and D.C. motors. **GEA-832.** Portable oil-testing sets. **GEA-869.** Magnetic switch for A.C. motor. **GEA-941.** Motor-driven, center-gear reciprocating air compressors for railway and industrial service. **GEA-953.** Steam turbines of condensing and extraction types. **GEA-957.** Mechanical-drive turbines. **GEA-961.** Sheath-wire resistor units for cable reel motors. **GEA-972.** Pot-type electric furnaces for cyanide hardening. **GEA-973.** Drum controllers for series-, shunt-, or compound-wound D.C. motors. **GEA-979.** Control circuit switches. **GEA-981.** Factory-built complete industrial and small switchboards. **GEA-994.** Travel carriage for automatic arc welders.